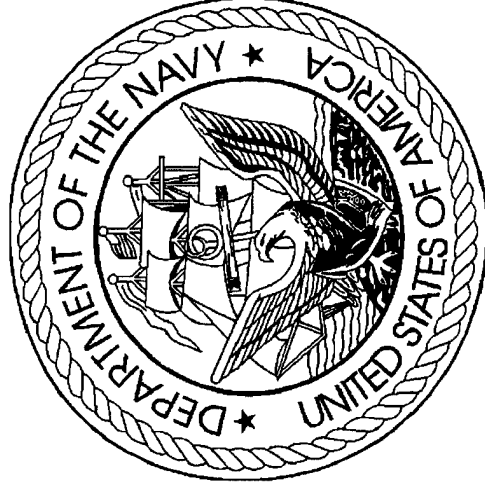


DEPARTMENT OF THE NAVY
FISCAL YEAR (FY) 2000/2001 BIENNIAL BUDGET
ESTIMATES



19990507 020

JUSTIFICATION OF ESTIMATES
FEBRUARY 1999

RESEARCH, DEVELOPMENT, TEST &
EVALUATION, NAVY
BUDGET ACTIVITY 7

DTIC QUALITY INSPECTED 4

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Department of the Navy
FY 2000 RDT&E Program

Exhibit R-1

APPROPRIATION: 1319n Research, Development, Test and Evaluation, Navy

DATE: February 1999

		Thousands of Dollars				Security Classification
Line Number	Program Element Number	Item Nomenclature	Budget Activity	FY 1998	FY 1999	FY 2000
150	0204227N	Harpoon Modifications	7	-	1,954	-
151	0101221N	Strategic Sub & Weapons System Support	7	35,556	56,437	45,907
152	0101224N	SSBN Security/Survivability Program (R2/R3 Materials provided in Classified Budget Book)	7	23,169	30,691	33,239
153	0101226N	Sub Acoustic Warfare Dev	7	5,747	8,080	3,195
154	0204136N	F/A-18 Squadrons	7	288,698	302,033	315,714
155	0204152N	E-2 Squadrons	7	58,303	46,622	16,132
156	0204163N	Fleet Communications	7	14,495	16,112	9,947
157	0204229N	Tomahawk & TMPC	7	101,679	165,685	147,223
158	0204311N	Integrated Surveillance System	7	9,256	19,372	18,025
159	0204413N	Amphib Tactical Support Units	7	649	1,869	-
160	0204571N	Consolidated Training Systems Development	7	59,768	38,226	26,257
161	0204575N	Information Warfare	7	1,574	3,707	9,162
162	0205601N	HARM Improvement	7	38,640	30,532	23,642
163	0205604N	Tactical Data Links	7	40,873	49,151	46,666
164	0205620N	Surface ASW Combat Sys Integration	7	12,190	12,953	16,633
165	0205632N	MK 48 ADCAP	7	10,285	17,428	20,426
166	0205633N	Aviation Improvements	7	47,600	62,098	53,293
167	0205667N	F-14 Upgrade	7	11,116	12,834	1,390
168	0205675N	Operational Nuclear Power Systems (R2/R3 Materials provided in Classified Budget Book)	7	54,604	54,058	53,564
169	0206313M	Marine Corps Communications	7	37,828	53,015	90,293
170	0206623M	MC Ground Combat/Spt Arms Sys	7	12,654	18,185	39,941
171	0206624M	MC Combat Services Support	7	5,288	4,044	9,817
172	0207161N	Tactical Air Intercept	7	55,120	64,626	40,051
173	0207163N	AMRAAM	7	5,475	4,674	13,544
174	0303906N	Aquarius (Classified -- Material Not Available)	7	-	-	602
175	0303901N	SIRIUS (Classified -- Material Not Available)	7	28,452	30,765	32,749

UNCLASSIFIED

Department of the Navy
FY 2000 RDT&E Program

Exhibit R-1

APPROPRIATION: 1319n Research, Development, Test and Evaluation, Navy

DATE: February 1999

		Thousands of Dollars				Security Classification
Line Number	Program Element Number	Item Nomenclature	Budget Activity	FY 1998	FY 1999	FY 2000
176	0303109N	Satellite Communications (Space)	7	18,062	17,523	38,921
177	0303140N	Information Systems Security Plan	7	17,287	21,003	22,978
178	0303150N	Global Command and Control	7	473	468	-
179	0303905N	Pisces	7	458,817	499,465	483,121
		(Classified -- Material Not Available)				
180	0305160N	Navy Meteorological and Ocean Sensors - Space (METOC)	7	4,610	11,614	14,507
181	0305188N	Joint (C4ISR) Battle Center	7	-	5,337	8,125
182	0303907N	Capricorn	7	2,277	2,297	2,064
		(Classified -- Material Not Available)				
183	0305204M	Tactical UAV	7	-	5,986	-
		(R2/R3 Not Required/Prior Year Only)				
184	0305204N	Tactical UAV	7	-	51,074	69,742
185	0305206N	Airborne Reconnaissance Advanced Development	7	-	16,411	4,958
186	0305207N	Manned Reconnaissance Systems	7	327	30,140	30,958
187	0305208N	Distributed Common Ground Systems	7	-	4,955	5,583
188	0305927N	Navy Space Surv	7	387	398	712
189	0305972N	Space Activities	7	-	14,546	-
190	0308601N	Naval Modeling & Simulation	7	4,212	-	9,621
191	0702207N	Depot Maintenance	7	-	58,202	39,986
192	0708011N	Industrial Preparedness (MANTECH)	7	51,892	68,886	59,104
193	0708730N	Maritime Technology (MARITECH)	7	-	18,956	19,681
		Total Operational Systems Development		1,517,363	1,932,412	1,877,473

UNCLASSIFIED

Department of the Navy
FY 2000 RDT&E Program
Alphabetic Listing

Exhibit R-1

APPROPRIATION: 1319n Research, Development, Test and Evaluation, Navy

DATE: February 1999

			Thousands of Dollars				Security Classification
Line Number	R-1 Program Element Number	Item Nomenclature	Budget Activity	FY 1998	FY 1999	FY 2000	
185	0305206N	Airborne Reconnaissance Advanced Development	7	-	16,411	4,958	U
159	0204413N	Amphib Tactical Support Units	7	649	1,869	-	U
173	0207163N	AMRAAM	7	5,475	4,674	13,544	U
174	0303906N	Aquarius (Classified -- Material Not Available)	7	-	-	602	U
166	0205633N	Aviation Improvements	7	47,600	62,098	53,293	U
182	0303907N	Capricorn (Classified -- Material Not Available)	7	2,277	2,297	2,064	U
160	0204571N	Consolidated Training Systems Development	7	59,768	38,226	26,257	U
191	0702207N	Depot Maintenance	7	-	58,202	39,986	U
187	0305208N	Distributed Common Ground Systems	7	-	4,955	5,583	U
155	0204152N	E-2 Squadrons	7	58,303	46,622	16,132	U
154	0204136N	F/A-18 Squadrons	7	288,698	302,033	315,714	U
167	0205667N	F-14 Upgrade	7	11,116	12,834	1,390	U
156	0204163N	Fleet Communications	7	14,495	16,112	9,947	U
178	0303150N	Global Command and Control	7	473	468	-	U
162	0205601N	HARM Improvement	7	38,640	30,532	23,642	U
150	0204227N	Harpoon Modifications	7	-	1,954	-	U
192	0708011N	Industrial Preparedness (MANTECH)	7	51,892	68,886	59,104	U
177	0303140N	Information Systems Security Plan	7	17,287	21,003	22,978	U
161	0204575N	Information Warfare	7	1,574	3,707	9,162	U
158	0204311N	Integrated Surveillance System	7	9,256	19,372	18,025	U
181	0305188N	Joint (C4ISR) Battle Center	7	-	5,337	8,125	U
186	0305207N	Manned Reconnaissance Systems	7	327	30,140	30,958	U
169	0206313M	Marine Corps Communications	7	37,828	53,015	90,293	U
193	0708730N	Maritime Technology (MARITECH)	7	-	18,956	19,681	U
171	0206624M	MC Combat Services Support	7	5,288	4,044	9,817	U
170	0206623M	MC Ground Combat/Spt Arms Sys	7	12,654	18,185	39,941	U
165	0205632N	MK 48 ADCAP	7	10,285	17,428	20,426	U

UNCLASSIFIED

Department of the Navy
FY 2000 RDT&E Program
Alphabetic Listing

Exhibit R-1

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DATE: February 1999

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188	0305927N	Navy Space Surv	7	387	398	712
168	0205675N	Operational Nuclear Power Systems	7	54,604	54,058	53,564
		(R2/R3 Materials provided in Classified Budget Book)				
179	0303905N	Pisces	7	458,817	499,465	483,121
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152	0101224N	SSBN Security/Survivability Program	7	23,169	30,691	33,239
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151	0101221N	Strategic Sub & Weapons System Support	7	35,556	56,437	45,907
153	0101226N	Sub Acoustic Warfare Dev	7	5,747	8,080	3,195
164	0205620N	Surface ASW Combat Sys Integration	7	12,190	12,953	16,633
172	0207161N	Tactical Air Intercept	7	55,120	64,626	40,051
163	0205604N	Tactical Data Links	7	40,873	49,151	46,666
183	0305204M	Tactical UAV	7	-	5,986	-
		(R2/R3 Not Required/Prior Year Only)				
184	0305204N	Tactical UAV	7	-	51,074	69,742
157	0204229N	Tomahawk & TMPC	7	101,679	165,685	147,223
		Total Operational Systems Development		1,517,363	1,932,412	1,877,473

Comparison of FY 1998 Financing as reflected
in FY 1999 Budget with 1998 Financing as
Shown in the FY 2000 Budget

	(\$ In Thousands)		
	Financing per FY 1999 Budget	Financing Per FY 2000 Budget	Increase (+) or Decrease (-)
Program Requirements (Service Account)	7,879,912	7,887,810	+7,898
Program Requirements (Reimbursable)	110,000	163,008	+53,008
Appropriation (Adjusted)	7,989,912	8,050,818	+60,906

Explanation of Changes in Financing
(\$ in Thousands)

The Fiscal Year 1998 program has changed since the presentation of the FY 1999 budget as noted below:

1. Program Requirements (Total). There has been a net increase to the appropriation (adjusted) of +\$60,906 as a result of changes in program requirements as noted below.
2. Program Requirements (Service Account). There has been a net increase to the appropriation (adjusted) of +\$7,898, resulting from various changes in program requirements. These changes included rescissions reflected in the FY 99 DoD Appropriations Act (-\$20,500), Line Item Veto Restorals (+\$6,000), and other Congressional Actions (-\$8,000). A number of Internal Reprogrammings were effected which reclassified funding between DoN appropriations to more properly align them into the correct programs for execution: Medical Research Projects (-\$7,278), Tactical Tomahawk (+\$19,600), PMRF Sensors (-\$4,852), F/A-18 (-\$14,855), and ASW Combat System Integration (+\$5,861). Additionally, other transfers included Overseas Contingency Operations (+\$7,500) and Counterdrug Operations (+\$15,613).
3. Program Requirements (Reimbursable). There has been a net increase to the appropriation of \$53,008, as a result of changes in reimbursable program requirements.

Comparison of FY 1998 Program Requirements as reflected
in the FY 1999 Budget with FY 1998 Program Requirements
as shown in the FY 2000 Budget

Summary of Requirements (\$ in Thousands)

	Total Program Requirements per FY 1999 Budget	Total Program Requirements per FY 2000 Budget	Increase (+) or Decrease (-)
01 - Basic Research	338,743	331,444	-7,299
02 - Applied Research	493,622	467,359	-26,263
03 - Advanced Technology Development	514,781	518,617	+3,836
04 - Demonstration and Validation (DEM/VAL)	2,219,002	2,222,171	+3,169
05 - Engineering and Manufacturing Development (EMD)	2,227,348	2,153,289	-74,059
06 - RDTE Management Support	551,033	677,567	+126,534
07 - Operational Systems Development	1,535,383	1,517,363	-18,020
Total Fiscal Year Program	7,879,912	7,887,810	+7,898

Explanation by Budget Activity
(\$ in Thousands)

01. Basic Research (-\$7,299) - Changes to this budget activity resulted from a transfer to support the Small Business Innovative Research (SBIR) program (-\$6,086) and other changes in program requirements which required minor reprogrammings (-\$1,213).
02. Applied Research (-\$26,263) - Changes to this budget activity resulted from a transfer to support the Small Business Innovative Research (SBIR) program (-\$8,125), other changes in program requirements which required minor reprogrammings (-\$21,118) and the override by Congress of a line item veto for Terfenol-D (+\$3,000).

03. Advanced Technology Development (+\$3,836) - Changes to this budget activity resulted from a transfer to support the Small Business Innovative Research (SBIR) program (-\$3,897), other changes in program requirements which required minor reprogrammings (-\$12,011), the override of a line item veto for COTS Airguns (+\$3,000), and the transfer of Medical Research program funds to the Army (-\$7,278).
04. Demonstration and Validation (DEM/VAL) (+\$3,169) - Changes to this budget activity resulted from a transfer to support the Small Business Innovative Research (SBIR) program (-\$29,846), reductions reflected on the FY 1999 DoD Appropriations Act Rescission for VECTOR (-\$3,000), and other changes in program requirements which required minor reprogrammings, budget activity realignments and accounting updates (+\$36,015).
05. Engineering and Manufacturing Development (EMD) (-\$74,059) - Changes to this budget activity resulted from a transfer to support the Small Business Innovative Research (SBIR) program (-\$56,113), transfers to support the Counterdrug Program (+\$15,613), other changes in program requirements which required minor reprogrammings, budget activity realignments and accounting updates (-\$26,019), a transfer to Defense Health Program and the Boy Scouts per a Congressional Supplemental (-\$5,000) and Federal Technology (-\$40), and a FY 1999 DoD Appropriation Act rescissions for Lightweight Torpedo (-\$1,500) and Navigation/ID Systems (-\$1,000).
06. RDTE Management Support (+\$126,534) - Changes to this budget activity resulted from a transfer to support the Small Business Innovative Research (SBIR) program (+\$120,551), other changes in program requirements which required minor reprogrammings, budget activity realignments and accounting updates (+\$5,747) and a transfer for Federal Technology (+\$236).
07. Operational Systems Development (-\$18,020) - Changes to this budget activity resulted from a transfer to support the Small Business Innovative Research (SBIR) program (-\$16,484), other changes in program requirements which required minor reprogrammings, budget activity realignments and accounting updates (-\$14,697), and transfers and major reprogrammings for Overseas Contingency Operations (+\$7,500), PMRF Sensors (-\$4,852), Tactical Tomahawk (+\$19,600), Surface ASW Combat Integration (+\$5,861), F/A-18 (-\$14,855), and Federal Technology Transfer (-\$93).

Comparison of FY 1999 Financing as reflected
in FY 1999 Budget with 1999 Financing as
Shown in the FY 2000 Budget

	(\$ In Thousands)		
	Financing per FY 1999 Budget	Financing Per FY 2000 Budget	Increase (+) or Decrease (-)
Program Requirements (Service Account)	8,108,923	8,660,809	+551,886
Program Requirements (Reimbursable)	110,000	150,000	+40,000
Appropriation (Adjusted)	8,218,923	8,810,809	+591,886

Explanation of Changes in Financing
(\$ in Thousands)

The Fiscal Year 1999 program has changed since the presentation of the FY 2000 budget as noted below:

1. Program Requirements (Total). There has been a net increase to the appropriation (adjusted) of +\$591,886, as a result of changes in program requirements as noted below.
2. Program Requirements (Service Account). There has been a net increase to the appropriation (adjusted) of +\$551,886, resulting from changes in program requirements as a result of Congressional appropriation changes in the FY 1999 DoD Appropriations Act. These changes included: an undistributed reduction for Federally Financed Research and Development Centers (FFRDC)(-\$4,264)(Section 8034), an undistributed reduction for Contract Advisory and Assistance Services (CAAS)(-\$50,000)(Section 8054), a general reduction for revised economic assumptions (lower inflation rate)(-\$20,000)(Section 8108), and a general undistributed reduction for civilian personnel underexecution (-\$5,000). Specific FY 1999 Congressional adjustments (to start, continue, discontinue, reduce or earmark 177 specific initiatives, including transfers) resulted in a net increase of +\$584,726. Also, appropriation changes include the following reprogrammings, which require Congressional prior approval: ASW & Other Helo Development (CH-60) (+\$9,352); Surface and Shallow Water Mines (+\$8,980); Combat Systems Integration (+\$12,526); Ship Self Defense (+12,672); partially financed by a reduction to Depot Maintenance (-\$11,006). Additionally, FY 1999 includes a transfer for the USACOM Joint Experiments program (+\$15,900), managed by the Navy as DoD executive agent.

3. Program Requirements (Reimbursable). There has been a net increase to the appropriation of +\$40,000, as a result of changes in reimbursable program requirements (+\$40,000).

Comparison of FY 1999 Program Requirements as reflected
in the FY 1999 Budget with FY 1999 Program Requirements
as shown in the FY 2000 Budget

Summary of Requirements (\$ in Thousands)

	Total Program Requirements per FY 1999 Budget	Total Program Requirements per FY 2000 Budget	Increase (+) or Decrease (-)
01 – Basic Research	362,679	361,499	-1,180
02 – Applied Research	524,723	566,801	+42,078
03 – Advanced Technology Development	460,725	593,176	+132,451
04 – Demonstration and Validation (DEM/VAL)	2,358,359	2,408,520	+50,161
05 – Engineering and Manufacturing Development (EMD)	2,063,281	2,199,737	+136,456
06 – RDTE Management Support	616,973	598,664	-18,309
07 – Operational Systems Development	1,722,183	1,932,412	+210,229
Total Fiscal Year Program	8,108,923	8,660,809	+551,886

Explanation by Budget Activity
(\$ in Thousands)

01. Basic Research (-\$1,180) - Changes to this budget activity resulted from the following Congressional undistributed reductions reflected in the FY 1999 DoD Appropriations Act. These changes included: an undistributed reduction for Federally Financed Research and Development Centers (FFRDC)(-\$7)(Section 8034), an undistributed reduction for civilian personnel underexecution (-\$338), and a general reduction for revised economic assumptions (lower inflation rate)(-\$835)(Section 8108).

02. Applied Research (+\$42,078) - Changes to this budget activity resulted from the following Congressional undistributed reductions reflected in the FY 1999 DoD Appropriations Act. These changes included: an undistributed reduction for Federally Financed Research and Development Centers (FFRDC)(-\$130)(Section 8034), an undistributed

reduction for Contract Advisory and Assistance Services (CAAS)(-\$1,755)(Section 8054), an undistributed reduction for civilian personnel underexecution (-\$724), and a general reduction for revised economic assumptions (lower inflation rate)(-\$1,313)(Section 8108). Specific FY 1999 Congressional adjustments (to start, continue, discontinue, reduce or earmark 31 specific initiatives, including transfers) resulted in a net increase of +\$46,000.

03. Advanced Technology Development (+\$132,451) - Changes to this budget activity resulted from the following Congressional undistributed reductions reflected in the FY 1999 DoD Appropriations Act. These changes included: an undistributed reduction for Federally Financed Research and Development Centers (FFRDC)(-\$146)(Section 8034), an undistributed reduction for Contract Advisory and Assistance Services (CAAS)(-\$1,571)(Section 8054), an undistributed reduction for civilian personnel underexecution (-\$516), and a general reduction for revised economic assumptions (lower inflation rate)(-\$1,316)(Section 8108). Specific FY 1999 Congressional adjustments (to start, continue, discontinue, reduce or earmark 33 specific initiatives, including transfers) resulted in a net increase of +\$113,100. Additionally, FY 1999 includes a transfer for the USACOM Joint Experiments program (+\$15,900), managed by the Navy as DoD executive agent. Last, the FY 1999 program is increased by +\$7,000 to fully fund the VECTOR program.

04. Demonstration and Validation (DEM/VAL) (+\$50,161) - Changes to this budget activity resulted from the following Congressional undistributed reductions reflected in the FY 1999 DoD Appropriations Act. These changes included: an undistributed reduction for Federally Financed Research and Development Centers (FFRDC)(-\$1,228)(Section 8034), an undistributed reduction for Contract Advisory and Assistance Services (CAAS)(-\$5,650)(Section 8054), an undistributed reduction for civilian personnel underexecution (-\$1,234), and a general reduction for revised economic assumptions (lower inflation rate)(-\$5,550)(Section 8108). Specific FY 1999 Congressional adjustments (to start, continue, discontinue, reduce or earmark 46 specific initiatives, including transfers) resulted in a net increase of +\$55,101. Also, appropriation changes include the following reprogrammings, which require Congressional prior approval: Surface and Shallow Water Mines (+\$8,980); Combat Systems Integration (+\$12,526); and CEC (+15,000); partially financed by a reduction to Gun Weapons Systems Technology (-\$11,301) and Hardened Target Munitions (-\$9,827). Additionally, changes in program requirements required minor reprogrammings (-\$6,656).

05. Engineering and Manufacturing Development (EMD) (+\$136,456) - Changes to this budget activity resulted from the following Congressional undistributed reductions reflected in the FY 1999 DoD Appropriations Act. These changes included: an undistributed reduction for Federally Financed Research and Development Centers (FFRDC)(-\$151)(Section 8034), an undistributed reduction for Contract Advisory and Assistance Services (CAAS)(-\$23,648)(Section 8054), an undistributed reduction for civilian personnel underexecution (-\$878) and a general reduction for revised economic assumptions (lower inflation rate) (-\$5,065)(Section 8108). Specific FY 1999 Congressional adjustments (to

start, continue, discontinue, reduce or earmark 41 specific initiatives, including transfers) resulted in a net increase of +\$136,979. Also, appropriation changes include the following reprogrammings, which require Congressional prior approval: AEGIS Combat System Improvements (-\$5,050); AEGIS Combat Systems Engineering (+\$24,300); AV-8B Aircraft (Engineering) (-\$9,615); ASW and Other Helo Developments (+\$9,352); and Ship Self-Defense (+\$12,672). Additionally, changes in program requirements required minor reprogrammings (-\$1,440).

06. RDTE Management Support (-\$18,309) - Changes to this budget activity resulted from the following Congressional undistributed reductions reflected in the FY 1999 DoD Appropriations Act. These changes included: an undistributed reduction for Federally Financed Research and Development Centers (FFRDC) (-\$2,292)(Section 8034), an undistributed reduction for Contract Advisory and Assistance Services (CAAS) (-\$3,338)(Section 8054), an undistributed reduction for civilian personnel underexecution (-\$485) and a general reduction for revised economic assumptions (lower inflation rate) (-\$1,394)(Section 8108). Specific FY 1999 Congressional adjustments (to start, continue, discontinue, reduce or earmark 10 specific initiatives, including transfers) resulted in a net decrease of -\$10,800.

07. Operational Systems Development (+\$210,229) - Changes to this budget activity resulted from the following Congressional undistributed reductions reflected in the FY 1999 DoD Appropriations Act. These changes included: an undistributed reduction for Federally Financed Research and Development Centers (FFRDC) (-\$310)(Section 8034), an undistributed reduction for Contract Advisory and Assistance Services (CAAS) (-\$14,038)(Section 8054), an undistributed reduction for civilian personnel underexecution (-\$825) and a general reduction for revised economic assumptions (lower inflation rate) (-\$4,527)(Section 8108). Specific FY 1999 Congressional adjustments (to start, continue, discontinue, reduce or earmark 27 specific initiatives, including transfers) resulted in a net increase of +\$243,346. Also, appropriation changes include the following reprogrammings, which require Congressional prior approval: Depot Maintenance -\$10,922. Additionally, changes in program requirements required minor reprogrammings (-\$2,495).

UNCLASSIFIED

EXHIBIT R-2, FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0604227N

PROGRAM ELEMENT TITLE: Harpoon Modifications

(U) COST: (Dollars in Thousands)

<u>Project Number & Title</u>	<u>FY 1998 Budget</u>	<u>FY 1999 Budget</u>	<u>FY 2000 Estimate</u>	<u>FY 2001 Estimate</u>	<u>FY 2002 Estimate</u>	<u>FY 2003 Estimate</u>	<u>FY 2004 Estimate</u>	<u>FY 2005 Estimate</u>	<u>To Complete</u>	<u>Total Program</u>
A1843 HARPOON		1,954							0	0
TOTAL	0	1,954	0	0	0	0	0	0	0	0

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

(U) A1843/HARPOON MODIFICATIONS Description: The Harpoon Block II Weapon System program was intended to upgrade and expand the capabilities of the U.S. Navy's only anti-ship missile to improve its precision in a congested littoral environment. The Navy funding for the program was canceled during POM-00 resulting in the Navy's withdrawal from further direct participation. FY-99 RDT&E funding will be utilized to: (1) Conduct captive carry demonstration testing of the existing Block IC weapon in order to determine maximum capability of the weapon; (2) Conduct an operational cost analysis of available ship attack weaponry for application as a possible successor to Harpoon Block IC; (3) Complete testing and evaluation of the Harpoon Surface Command Launch Control System (HSLCS) 9/10 upgrade to add World Vector Shoreline and enhanced weapon search patterns for existing launch control system.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it encompasses engineering and manufacturing development for upgrade of existing, operational systems.

R-1 Item No. 150
UNCLASSIFIED

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EXHIBIT R-2, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0604227N

PROGRAM ELEMENT TITLE: Harpoon Modifications

1. FY 1998 PLAN:
 - (U) (\$ 0)
2. FY 1999 PLAN:
 - (U) (\$ 500) Complete captive carry demonstrations of Harpoon Block IC sensor and missile guidance system in a littoral environment.
 - (U) (\$ 953) Complete operational cost analysis of available ship attack weaponry versus upgrades to Harpoon Block IC to include non-recurring and total life cycle costs.
 - (U) (\$ 500) Complete testing and evaluation of HSCLCS 9/10 for fleet introduction.
 - (U) (\$ 1) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.
3. FY 2000 PLAN:
 - (U) (\$ 0)

R-1 Item No. 150
UNCLASSIFIED

UNCLASSIFIED

EXHIBIT R-2, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0604227N

PROGRAM ELEMENT TITLE: Harpoon Modifications

(U) B. PROGRAM CHANGE SUMMARY		<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
(U) FY 1999 President's Budget:		N/A	1,965	1,958
(U) Appropriated Value:			1,965	
(U) Adjustments from President's Budget:			-11	-1,958
(U) FY 2000 President's Budget Submit:		N/A	1,954	0

CHANGE SUMMARY EXPLANATION:

- (U) Funding:** FY 99 decrease reflects \$-11 thousand for minor program adjustments. FY00 change due to the re-evaluation of the Harpoon weapon system upgrade strategy.
- (U) Schedule:** N/A
- (U) Technical:** N/A

(U) C. OTHER PROGRAM FUNDING SUMMARY: N/A

Related RDT&E: N/A

(U) D. ACQUISITION STRATEGY: This is a non-ACAT program with no specific acquisition strategies.

(U) E. SCHEDULE PROFILE: N/A

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Exhibit R-2, RDT&E Budget Item Justification		Date: FEB 1999
APPROPRIATION/BUDGET ACTIVITY	Program Element Name & No.	
RDT&E,N - BA7	PE 010221N, Strategic Sub & Weapons System Support	

cost (\$ in Millions)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Total PE Cost	35.6	56.5	45.9	45.3	47.0	40.7	42.3	49.3	CONT.	CONT.
J0951 TRIDENT II	8.9	10.0	9.1	9.6	9.8	1.6	1.7	1.8	CONT	CONT
S0004 TRIDENT Submarine System Improvement	4.5	7.4	2.2	0	.6	1.5	1.9	7.9	CONT	CONT
J2228 Technology Applications Program	22.2	39.1	34.6	35.7	36.6	37.6	38.7	39.6	CONT	CONT
RDT&E Articles Qty										

A. (U) Mission Description and Budget Item Justification:

The TRIDENT II (D5) Submarine Launched Ballistic Missile (SLBM) provides the U.S. a weapon system with greater accuracy and payload capability as compared to the TRIDENT I (C4) system. TRIDENT II enhances U.S. strategic deterrence providing a survivable sea-based system capable of engaging the full spectrum of potential targets with fewer submarines. This PE supports continued evaluation of the system's long range performance and capabilities as well as investigations into new technologies which would help mitigate the program impact due to component obsolescence and a rapidly decreasing manufacturing support base. Efforts also include Reentry System and Guidance System Applications efforts. The TRIDENT Submarine System Improvement Program develops and integrates command and control Improvements needed to maintain TRIDENT Submarine operational capability through the life cycle of this vital strategic asset. The program conducts efforts needed to maintain strategic connectivity, ensure platform invulnerability, and reduce lifecycle costs through Obsolete Equipment Replacement (OER) and commonality.

(U) JUSTIFICATION FOR BUDGET ACTIVITY:

This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it encompasses engineering and manufacturing development for upgrade of existing, operational systems.

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Exhibit R-2 RDT&E Budget Item
(Exhibit R-2, Page 1 of 18)

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APPROPRIATION/BUDGET ACTIVITY		Exhibit R-2, RDT&E Budget Item Justification	Date: FEB 1999
RDT&E,N - BA7		Program Element Name & No. PE 010221N, Strategic Sub & Weapons System Support	

B. (U) Program Change Summary:

FY 1999 President's Budget
Appropriated Value
Adjustments to FY 1998 Appropriated/FY 1999 President's Budget
FY 2000/2001 President's Budget Submit

FY 1998	FY 1999	FY 2000
39.1	56.6	49.5
39.1	56.6	49.5
-3.5	- 0.1	-3.6
35.6	56.5	45.9

Explanation: For all projects in FY 1998 there are SBIR assessments of -\$0.7 and various taxes of -\$0.5. For project J0951, \$1.7 was transferred out to finance closed account billings and for Project J2228 \$6 was similarly transferred out. In FY 1999, Project J2228 was assessed a revised economic assumption of -\$1.1. Project J0951 increases by \$0.1 for NWCFF rate adjustments in FY 2000. Project J2228 reflects affordability reductions of \$3.2M in FY 2000 for the Technology Applications programs. Additionally, Projects J2228 and J0951 were assessed inflation adjustments of -\$5 in FY 2000. .

C. (U) Other Program Funding Summary: See enclosed R-2a for each individual project data.

D. (U) Acquisition Strategy: See enclosed R-2a for each individual project data.

E. (U) Schedule Profile: Not Applicable.

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Exhibit R-2 RDT&E Budget Item
(Exhibit R-2, Page 2 of 18)

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Exhibit R-2a, RDT&E Project Justification			Date: FEB 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E,N - BA7	Program Element Name & No. PE 010221N, Strategic Sub & Weapons System Support	Project Name and Number. TRIDENT II - J0951	

Cost (\$ in Millions)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Project Cost J0951 TRIDENT II	8.9	10.0	9.1	9.6	9.8	1.6	1.7	1.8	CONT.	CONT.
RDT&E Articles Qty										

A. (U) Mission Description and Budget Item Justification:

The TRIDENT II (D5) Submarine Launched Ballistic Missile (SLBM) provides the U.S. a weapon system with greater accuracy and payload capability as compared to the TRIDENT I (C4) system. TRIDENT II enhances U.S. strategic deterrence by providing a survivable sea-based system capable of engaging the full spectrum of potential targets with fewer submarines. This project supports continued evaluation of the system's long range performance and capabilities as well as investigations into new technologies which would help mitigate the program impact due to component obsolescence and a rapidly decreasing manufacturing support base.

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Exhibit R-2a RDT&E Project Justification
(Exhibit R-2a, Page 3 of 18)

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Exhibit R-2a, RDT&E Project Justification		Date: FEB 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E,N - BA7	Program Element Name & No. PE 010221N, Strategic Sub & Weapons System Support	Project Name and Number. TRIDENT II - J0951

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1998 ACCOMPLISHMENTS:
 - (U) (\$8.9) SRS: Effort continued in support of phase three development of the SLBM Retargeting System. This effort is fully obligated.
2. (U) FY 1999 PLAN:
 - (U) (\$9.2) SRS: Effort continues in support of phase three development of the SLBM Retargeting System. Full obligation is projected by 3rd quarter of the 1st year.
 - (U) (\$.8) This represents funding utilized to finance closed account billings. Full obligation is projected by the end of the fiscal year.
3. (U) FY 2000 PLAN:
 - (U) (\$8.2) SRS: Effort continues in support of phase three development of the SLBM Retargeting System. Full obligation is projected by 3rd quarter of the 1st year.
 - (U) (\$0.9) This represents funding utilized to finance closed account billings. Full obligation is projected by the end of the fiscal year.

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Exhibit R-2a RDT&E Project Justification
(Exhibit R-2a, Page 4 of 18)

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Exhibit R-2a, RDT&E Project Justification			Date: FEB 1999
APPROPRIATION/BUDGET ACTIVITY	Program Element Name & No.	Project Name and Number.	
RDTE&N - BA7	PE 010221N, Strategic Sub & Weapons System Support	TRIDENT II - J0951	

B. (U) Other Program Funding Summary: (Dollars in Thousands)

	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Complete	Total Program
	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

(U) Related RDT&E: N/A

C. (U) Acquisition Strategy:

Contracts will continue to be awarded to those sources who were engaged in the TRIDENT II (D5) development program and are currently engaged in the production and/or operational support of the deployed D5/C4 Strategic Weapons Systems on the basis of Other Than Full and Open Competition pursuant to the authority of 10 U.S.C. 2304 ©(1) and (3) implemented by FAR 6.302.-1, 3 4.

D. (U) Schedule Profile: Not Applicable.

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Exhibit R-2a RDT&E Project Justification
(Exhibit R-2a, Page 5 of 18)

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Exhibit R-3. Cost Analysis		Date: FEB 1999
APPROPRIATION/BUDGET ACTIVITY	Program Element Name & No.	Project Name and Number
RDT&E,N - BA7	PE 010221N, Strategic Sub & Weapons System Support	TRIDENT II - J0951

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Exhibit R-3, Cost Analysis		Date: FEB 1999	
APPROPRIATION/BUDGET ACTIVITY RDT&E,N - BA7	Program Element Name & No. PE 010221N, Strategic Sub & Weapons System Support		Project Name and Number. Technology Applications - J2228

Cost (\$ in Millions)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Project Cost J2228	22.2	39.1	34.6	35.7	36.6	37.6	38.7	39.6	CONT.	CONT.
Technology Applications Program										
RDT&E Articles Qty										

A. (U) Mission Description and Budget Item Justification:

This supports implementation of a coordinated Air Force/Navy Reentry System Applications Program as well as the implementation of a Strategic Guidance Applications Program. Reentry Vehicle and Guidance Technology is rapidly eroding beyond the point of being capable to respond to increasing aging phenomena and future requirements. The Nuclear Posture Review examined the infrastructure which supports the nuclear force structure. It concluded that special actions were required to correct the rapidly eroding capability to maintain confidence in the existing weapon systems, and recommended that the reentry vehicle and guidance technology bases should be preserved. That recommendation resulted in the Presidential Decision Directive-30, which directed that programs be established for the reentry vehicle and guidance technology application.

- Through sustainment of the Reentry Vehicle Technology Base, confidence in the dependability and reliability of Strategic SLBM and ICBM weapon systems will be maintained over the long term when no new systems will be in development. Critical and unique attributes necessary for the design, development and in-service support of current and modernized SLBM Reentry Systems will be defined and maintained to insure a functioning readiness application technical capability in reentry is preserved. Working closely with the Air Force, Navy requirements will be integrated with the Air Force requirements into a comprehensive program. The Program will maintain close coordination with the DOD Science and Technology (S&T) Community through the Reliance process in order to: leverage S&T programs, ensure system driven technology base requirements are considered in contract awards, eliminate duplication of effort and provide an opportunity to demonstrate appropriate emerging technologies through a reentry flight test evaluation process.
- This Program provides a minimum Strategic Guidance core technology development capability consistent with the Strategic Advisory Group (SAG) recommendations to CINCSTRAT. In the SAG recommendations SSP is to establish a program which preserves this critical design and development core. It is a basic bridge program which develops critical guidance technology applicable to any of the existing Air Force/Navy Strategic Missiles. The objective is to transition from current capability to a long term readiness status required to support deployed systems. Air Force and Navy guidance technology requirements shall be integrated and needs prioritized. Efforts shall be focused on alternatives to currently utilized technologies identified as system "weak links". Current system accuracy and functionality depends upon key technologies which provide radiation hardened velocity, attitude and stellar sensing capabilities. As the underlying technologies that currently provide these capabilities age and are no longer technically supportable modern alternatives must be made available in order to allow for orderly replacement. There is no commercial market for these technologies and their viability depends on the Strategic community. This technology development activity will support the D-5 missile life extension efforts that are required to ensure that TRIDENT II weapon system life matches the recent hull life extension on the TRIDENT submarine.

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Exhibit R-3 Project Cost Analysis
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Exhibit R-3, Cost Analysis		Date: FEB 1999
APPROPRIATION/BUDGET ACTIVITY	Project Name and Number.	
RDTE&N - BA7	PE 0101221N, Strategic Sub & Weapons System Support	Technology Applications - J2228

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1998 Accomplishments

- (U) (\$11.9) Continued Reentry System Applications Program. Full obligation was completed by the 4th quarter of the 1st year. FY 1998 efforts included:
 - (U) Continued Ground Testing of reentry vehicle candidate materials including those available from Science & Technology (S&T).
 - (U) Focused efforts on development and ground testing of low-cost replacement materials.
 - (U) Developed program plan for testing and evaluation of reentry components exposed to operational environments beyond their design life.
 - (U) Maintained program technical plan, conduct system assessments and demonstrate replacement hardware suitability.
 - (U) Continued development of instrumentation for flight test applications.
 - (U) Focused efforts on Nostrip Recession Sensor (NRS) and Arming Fuzing & Firing (AF&F) instrumentation for flight-test applications.
- (U) (\$10.3) Continued Strategic Guidance Applications Program. Full obligation was completed by 4th quarter of the 1st year. FY 1998 efforts included:
 - (U) Continued development of the current Guidance Modeling and Simulation (Integrated Engineering Environment-IEE) towards full system functionality. Primary effort in FY 1998 is the attitude gimbal control design.
 - (U) Continued the prototype/design tradeoff effort for the next generation PIGA. Continue the review of alternate accelerometer efforts/technologies. The completion of radiation testing of IFOG technology occurred in early FY 1998. Evaluation of English Electric Valve (EEV) stellar sensors for SIGHTS (Strategic Inertial Guidance Hardware Technology Synthesizer) continues. SIGHTS will be used as a proof of concept and initial hardware correlation of IEE. Initiation evaluation of design alternatives for future microprocessor functionality such as ASIC/gate array technology.

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Exhibit R-3, Cost Analysis	Date: FEB 1999
APPROPRIATION/BUDGET ACTIVITY	Project Name and Number.
RDT&E.N - BA7	Technology Applications - 12228

2. (U) FY 1999 Plan

- (U) (\$21.6) Continue Reentry System Applications Program. Full obligation is projected by the 3rd quarter of the 1st year. FY 1999 efforts include:
 - (U) Conduct ground testing of reentry vehicle candidate materials including those available from Science & Technology (S&T).
 - (U) Initiate down-select process of low-cost candidate replacement materials.
 - (U) Initiate procurement and testing of reentry hardware components exposed to operational environments beyond their design life.
 - (U) Maintain RSAP technical program plan, conduct system assessments and identify tools to conduct Vulnerability & Hardening certification in absence of Nuclear Underground Testing (UGT) facilities.
 - (U) Continue development of instrumentation for flight test applications.
 - (U) Demonstrate developed Arming, Fuzing & Firing (AF&F) instrumentation.
 - (U) Initiate feasibility of low-cost replacement candidate for aging Mk4 AF&F.
- (U) (\$17.5) Continue Strategic Guidance Applications Program. Full obligation is projected by the 3rd quarter of the 1st year. FY 1999 efforts include:
 - (U) Structural (mechanical and thermal) and system performance will be added to IEE system functionality along with improved fidelity towards a "virtual" system capability in FY 2001. Continue expanding the hardware design support of SIGHTS into other subsystems such as attitude and stellar and their associated hardware correlation. One of the evaluation tools initiated in FY 1997 under SIGHTS was a set of "probes" for better diagnostic evaluation of the TRIDENT D-5 guidance system. Delivery and utilization of these probes will begin. SIGHTS will support initial full systems capability.

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Exhibit R-3 Project Cost Analysis
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Exhibit R-3, Cost Analysis		Date: FEB 1999
APPROPRIATION/BUDGET ACTIVITY	Program Element Name & No.	Project Name and Number.
RD1&EN - BA7	PE 010221N, Strategic Sub & Weapons System Support	Technology Applications - J2228

- (U) Complete the prototype alternate PIGA design studies and test towards a Critical Design Review. Initiate evaluation of IFOG architecture solutions to radiation issues found in component testing (approximately two-year effort). Procure alternate stellar sensors to TRIDENT II format. Continue the microprocessor effort. Develop attitude and stellar modules.
3. (U) FY 2000 Plan
- (U) (\$19.2) Continue Reentry System Applications Program. Full obligation is projected by the 3rd quarter of the 1st year. FY 2000 efforts include:
 - (U) Continue ground testing of reentry vehicle candidate materials including those available from Science & Technology (S&T).
 - (U) Continue down-select process of low-cost candidate replacement materials.
 - (U) Initiate planning and procurement of required hardware and instrumentation for demonstration of low-cost replacement heatshield.
 - (U) Initiate build-up of heavily instrumented flight unit for aged hardware evaluation.
 - (U) Continue ground testing of reentry components exposed to operational environments beyond their design life.
 - (U) Maintain RSAP technical program plan, conduct system assessments and initiate Vulnerability & Hardening certification process in absence of Nuclear Under Ground Testing (UGT) facilities.
 - (U) Evaluate Arming, Fuzing & Firing (AF&F) flight data.
 - (U) (\$15.4) Continue Strategic Guidance Applications Programs (GAP). Full obligation is projected by the 3rd quarter of the 1st year. FY 2000 efforts include:
 - (U) Complete and more fully utilize the IEE virtual system capability. Continue with IEE/SIGHTS towards a "real time" hardware-in-loop simulation capability targeted for completion in late FY 2001. Begin to utilize the IEE/SIGHTS capability to perform system architecture/design tradeoffs. Initiate prototype alternate PIGA fabrication and subassembly testing.

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Exhibit R-3 Project Cost Analysis
(Exhibit R-3, Page 10 of 18)

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Exhibit R-3, Cost Analysis		Date: FEB 1999
APPROPRIATION/BUDGET ACTIVITY	Program Element Name & No.	Project Name and Number.
RDTE&N - BA7	PE 0101221N, Strategic Sub & Weapons System Support	Technology Applications - J2228

(U) Continue IFOG work started in FY 1999. Initiate stellar subsystem prototype using EEV or alternate sensor technology. If schedule allows, integrate EEV or alternate stellar sensor and alternate microprocessor technology into SIGHTS. Initiate circumvention design development using available rad-hard microprocessor technology.

B. (U) Other Program Funding Summary: (Dollars in Thousands)

FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To	TOTAL
ESTIMATE	ESTIMATE	ESTIMATE	ESTIMATE	ESTIMATE	ESTIMATE	ESTIMATE	ESTIMATE	COMPLETE	PROGRAM
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

(U) Related RDT&E: N/A

C. (U) Acquisition Strategy:

Contracts will continue to be awarded to those sources who were engaged in the TRIDENT II (D5) development program and are currently engaged in the production and/or operational support of the deployed D5/C4 Strategic Weapons Systems on the basis of Other Than Full and Open Competition pursuant to the authority of 10 U.S.C. 2304 (c) (i) and (3) implemented by FAR 6.302-1, 3 4.

D (U) Schedule Profile: Not Applicable

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Exhibit R-3 Project Cost Analysis
(Exhibit R-3, Page 11 of 18)

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Exhibit R-3, Cost Analysis		Date: FEB 1999	
APPROPRIATION/BUDGET ACTIVITY RDT&E,N - BA7	Program Element Name & No.		Project Name and Number. Technology Applications - J2228
	PE 0101221N, Strategic Sub & Weapons System Support		

Cost Categories	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date	FY01 Cost	FY01 Award Date	Cost To Complete	Total Cost	Target Value of Contract
SUPPORT AND MANAGEMENT	SS - CPFF	LMMS/CAL	16.4	11.0	10/98	9.7	10/99			CONT.	CONT.	CONT.
TECHNOLOGY APPLICATIONS	WR	NSWC/VA	12.2	2.5	10/98	1.8	10/99			CONT.	CONT.	CONT.
TECHNOLOGY APPLICATIONS	SS - CPFF	HITCO/CAL	.0	2.2	10/98	2.1	10/99			CONT.	CONT.	CONT.
TECHNOLOGY APPLICATIONS	SS - CPFF	INTERMAT/MAINE	.0	1.6	10/98	1.6	10/99			CONT.	CONT.	CONT.
TECHNOLOGY APPLICATIONS	SS - CPFF	SORI/ALA	.0	.8	10/98	0.9	10/99			CONT.	CONT.	CONT.
TECHNOLOGY APPLICATIONS	WR	SNL/NM	2.1	1.8	10/98	1.0	10/99			CONT.	CONT.	CONT.
TECHNOLOGY APPLICATIONS	SS - CPFF	CSDL/MA	0.2	1.2	10/98	1.5	10/99			CONT.	CONT.	CONT.
TECHNOLOGY APPLICATIONS	SS - CPFF	KAMAN/CO	1.6	0.5	10/98	0.6	10/99			CONT.	CONT.	CONT.
TECHNOLOGY APPLICATIONS	SS - CPFF	CSDL/MA	30.1	17.5	10/98	15.4	10/99			CONT.	CONT.	CONT.
Subtotal Support			62.0	39.1		34.6						
Remarks:												

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Exhibit R-3 Project Cost Analysis
(Exhibit R-3, Page 12 of 18)

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Exhibit R-2a, RDT&E Project Justification		Date: FEB 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E-N - BA7	Program Element Name & No. PE 010221N, Strategic Sub & Weapons System Support	Project Name and Number. TRIDENT Submarine System Improvement - S0004

Cost (\$ in Millions)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Project Cost S0004 TRIDENT Submarine System Improvement	4.5	7.4	2.2	0.0	.6	1.5	1.9	8.0	CONT.	CONT.
RDT&E Articles Qty										

a. (U) Mission Description and Budget Item Justification:

The TRIDENT Submarine System Improvement Program develops and integrates command and control improvements needed to maintain TRIDENT submarine operations capability through the life cycle of this vital strategic asset. The program conducts efforts needed to maintain strategic connectivity, ensure platform invulnerability, and reduce life cycle costs through Obsolete Equipment Replacement (OER) and commonality.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1998 ACCOMPLISHMENTS:

- (U) (\$2.6) Initiated development of TRIDENT CCS MK2 Block 1C Defensive Weapons System (DWS) Program.
- (U) (\$.6) Initiated development of AN/BQQ-6 Sonar to AN/BQQ-5E sonar Translator.
- (U) (\$.8) Continued development of Acoustic Rapid Commercial-off-the-Shelf (COTS) Insertion (ARCI) Phase I/II Multipurpose Processor (MPP) Program.
- (U) (\$.5) Initiated Architecture Model Maintenance and COTS Technical Refresher.

• (U) FY 1999 PLAN

- (U) (\$3.4) Complete development of TRIDENT CCS MK2 Block 1C DWS Program.
- (U) (\$2.7) Continue development of ARCI Phase I/II MPP Program.
- (U) (\$1.1) Continue Architecture Model Maintenance and COTS Technical Refresher.
- O (U) (\$0.2) Portion of extramural program is reserved for Small Business Innovation Research assessment in accordance with 15 USC 638

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Exhibit R-2a RDT&E Project Justification
(Exhibit R-2a, Page 13 of 18)

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Exhibit R-2a, RDT&E Project Justification		Date: FEB 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E - BA7	Program Element Name & No. PE 010221N, Strategic Sub & Weapons System Support	Project Name and Number. TRIDENT Submarine System Improvement - S0004

3. (U) FY 2000 PLAN:

- (U) (\$.5) Complete development of ARCI Phase I/II MPP Program.
- (U) (\$1.7) Continue Architecture Model Maintenance and COTS Technical Refresher.

4. (U) FY 2001 PLAN: Not applicable.

B. (U) Program Change Summary:

(U) FY 1999 President's Budget:

(U) Appropriated Value:

(U) Adjustment to FY 1998 Appropriated Value/FY 1999 President's Budget:

a. Small Business Innovative Research (SBIR):

b. Minor Pricing Adjustments:

(U) FY 2000/01 PRES Budget Submit:

	FY 1998	FY 1999	FY 2000
	4.6	7.4	2.2
	4.7		
	-1		
	-1		
	4.5	7.4	2.2

(U) Funding: The total decrease of \$.2M in FY98 consists of a \$.1M reduction for SBIR and a \$.1M reduction for minor pricing adjustments.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

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APPROPRIATION/BUDGET ACTIVITY		Exhibit R-2a, RDT&E Project Justification		Date: FEB 1999
RDT&E,N - BA7	Program Element Name & No.		Project Name and Number.	
	PE 0101221N, Strategic Sub & Weapons System Support		TRIDENT Submarine System Improvement - S0004	

C. (U) Other Program Funding Summary:

	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Complete	Total Cost
267600/267606 (BA-2) Strategic Platform Support Equipment										
7.2	12.4	22.2	15.9	11.7	20.8	25.7	13.0	CONT.	CONT.	
535500/535506 (BA-4) Strategic Platform Support Equipment										
2.2	2.9	9.5	4.7	10.6	8.7	2.3	4.8	CONT.	CONT.	

(U) Related RDT&E: These PEs develop submarine software and hardware that are directly related to efforts conducted by the program element.

(U) PE 0101224N (SSBN Security Survivability Program)

(U) PE 0101402N (Navy Strategic Communications)

(U) PE 0604562N (Submarine Tactical Warfare System)

(U) PE 0604503N (Submarine System Equipment Development)

D. (U) Acquisition Strategy:

The TRIDENT operational systems development program results in improvements to the baseline TRIDENT Combat System. Current TRIDENT Combat Systems were first developed in the early 1970s and are becoming increasingly difficult to maintain and offer comparatively less performance than more recently designed systems. Previous efforts to upgrade portions of the TRIDENT Combat System include improvements via sonar and combat control hardware and software (e.g., QE2 programs), feasibility of increased countermeasure capability and a concept evaluation of an Submarine Force Mission Program Library (SFEMPL) interface. Due to the sensitivity of TRIDENT programs it is assessed that international technology will not have a major impact or be a recipient of the benefits derived from this effort. Development strategies will significantly enhance the sustainability and operability of the sonar, communications and Combat Control Systems on TRIDENTs by evaluating both OER possibilities and potential improvements.

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Exhibit R-2a RDT&E Project Justification
(Exhibit R-2a, Page 15 of 18)

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APPROPRIATION/BUDGET ACTIVITY RDT&E,N - BA7	<div> <div>Exhibit R-2a, RDT&E Project Justification</div> <div> <div>Project Name and Number.</div> <div>TRIDENT Submarine System Improvement - S0004</div> </div> </div> <div> <div>Program Element Name & No.</div> <div>PE 010221N, Strategic Sub & Weapons System Support</div> </div>	Date: FEB 1999
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E. (U) Schedule Profile:

Successful program development will lead to the submission and approval of system and subsystem Engineering Changes for installation during SSBN 726 class submarine backfits. Specific deliverable dates for the RDT&E,N and OP,N programs are:

ARCI Phase I/II -	<div> <div>FY97 (2nd Qtr) - Program Inception</div> <div>FY00 (4th Qtr) - Install and Test Prototype</div> <div>FY02 (1st Qtr) - ARCI Certification/IOC</div> </div>
CCS MK2 Block 1C -	<div> <div>FY98 (2nd Qtr) - Program Inception</div> <div>FY00 (4th Qtr) - Install and Test Prototype</div> <div>FY02 (1st Qtr) - Certification/IOC</div> </div>
Architecture Model Maint. & COTS Technology Refresh - Management Processes	<div> <div>FY98 (2nd Qtr) - Program Inception</div> <div>FY00 - CONT. - COTS Supportability, Architecture Maintenance and COTS</div> </div>
Q6 to Q5 Translator -	<div> <div>FY98 (2nd Qtr) - Program Inception; Installation and Test; Certification/IOC</div> </div>

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Exhibit R-2a RDT&E Project Justification
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Exhibit R-3 Cost Analysis			PROGRAM ELEMENT NAME AND NUMBER										Date: FEB 1999		PROJECT NAME AND NUMBER	
APPROPRIATION/BUDGET ACTIVITY			Strategic Submarine & Weapons System Support, PE 010221N												TRIDENT Submarine System Improvement, S0004	
RDT&E,N - BA7																
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date	FY01 Cost	FY01 Award Date	Cost To Complete	Total Cost	Target Value of Contract				
Design/Development Engineering	SS - CPIF	Raytheon, Portsmouth RI	2.6	3.4	12/98	0	N/A		N/A	0	6.0	6.0				
Software Development	WR	NIWC, Newport RI	.6	0	N/A	0	N/A		N/A	0	.6	.6				
Design/Development Engineering	SS - CPFF	Lockheed Martin, Manassas VA	2.3	2.7	12/98	.5	12/99		N/A	0	5.3	5.3				
Design/Development Engineering	Various	Various	11.7	0	N/A	0	N/A		N/A	0	11.7	11.7				
Subtotal Product Development			17.2	6.1		.5				0	23.6	23.6				
Remarks:																
Support and Management	Various	Various	.02	0	N/A	0	N/A	0	N/A	0	.02	.02				
Subtotal Support			.02	0		0		0		0	.02	.02				
Remarks:																

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Exhibit R-3 Project Cost Analysis
(Exhibit R-3, Page 17 of 18)

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Exhibit R-3 Cost Analysis		Date: FEB 1999	
APPROPRIATION/BUDGET ACTIVITY RDT&E,N - EA7	PROGRAM ELEMENT NAME AND NUMBER Strategic Submarine & Weapons System Support, PE 010221N	PROJECT NAME AND NUMBER	
		TRIDENT Submarine System Improvement, S0004	

Cost Categories	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date	FY01 Cost	FY01 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Test and Certification	WR	NIWC, Newport RI	.3	15	10/98	17	10-99	0	N/A	CONT.	CONT.	CONT.
Test and Certification	Various	Various	.7	0	N/A	0	N/A	0	N/A	0	.7	.7
Subtotal T&E			11	15		17		0		CONT.	CONT.	CONT.
Remarks: After transition to Commercial Off-The-Shelf (COTS) based systems, obsolescence becomes a major issue. To keep current, it is necessary to support the development and maintenance of a RDT&E process to maintain TRIDENT subsystems using commercial technology and parts. This model will continue the evaluation and implementation of COTS Technology.												
Subtotal Management			0	0	N/A	0	N/A	0	N/A	0	0	0
Remarks: Government Furnished Property - not applicable.												
Total Cost			18.3	7.4		2.2		0		CONT.	CONT.	CONT.
Remarks:												

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Exhibit R-3 Project Cost Analysis
(Exhibit R-3, Page 18 of 18)

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Exhibit R-2, RDT&E Budget Item Justification		Date: FEB 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E / BA 7	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No.: Submarine Acoustic Warfare Development / 0101226N	

COST (\$ in Millions)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Total P.E. Cost	5.7	8.1	3.2	.9	1.0	1.1	3.0	8.8	CONT.	CONT.
Submarine Defensive Warfare / V1265	5.7	8.1	3.2	.9	1.0	1.1	3.0	8.8	CONT.	CONT.
Quantity of RDT&E Articles & cost										

A. Mission Description and Budget Item Justification: This project develops a Submarine Defensive Warfare System (SDWS) to improve the effectiveness and survivability of all classes of US submarines. Project efforts consist of a new acoustic threat intercept system (AN/WLY-1) that will have threat platform sonar and torpedo recognition capability for early detection, classification, and tracking of threats. It will allow radius of curvature and multipath ranging. The system will also include a control subsystem for launch management of all onboard countermeasure devices and launchers. Next Generation Countermeasure (NGCM) including Weapons Analysis Facility (WAF) simulation analysis capability provides the US Navy with testing of hardware and software within detailed representations of acoustic environments.

1. FY 1998 ACCOMPLISHMENTS:

- (U) (\$5.747) Continued fabrication and development testing and conducted At-Sea test for the AN/WLY-1.

2. FY 1999 PLAN:

- (U) (\$7.948) Complete sensor and software development and continue Phase II design review.
- (U) (\$0.132) Portion of extramural program is reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. FY 2000 PLAN:

- (U) (\$3.195) Complete Phase II Design Review and conduct TECHEVAL/OPEVAL for the AN/WLY-1 system.

R-1 Item No 153 - 1 of 153 - 5

Exhibit R-2 RDT&E Budget Item Justification
(Exhibit R-2, Page 1 of 5)

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Exhibit R-2, RDT&E Budget Item Justification		Date: FEB 1999
R-1 ITEM NOMENCLATURE		
Program Element (PE) Name and No.: Submarine Acoustic Warfare Development / 0101226N		
APPROPRIATION/BUDGET ACTIVITY		
RDT&E / BA 7		

B. Program Change Summary:

FY 1999 President's Budget:

Appropriated Value:

Adjustment to FY 1998/99 Appropriated Value/

FY 1999 President's Budget::

a) FY98 SBIR Transfer

b) Federal Technology Transfer

c) Countermeasure Adjustment

d) Outsourcing Adjustment

e) NWCf Rates

f) Minor Pricing Adjustments

g) FY1998 Update

h) Contract Advisory & Assistance

i) No Pay Inflation

FY 2000/01 PRES Budget Submit:

FY 1998	FY 1999	FY 2000
5,800	8,328	6,535
6,058	8,328	
-106		
-001		
		-3,300
		-006
		+007
		+005
-003	-027	
+054		
	-221	
		-046
5,747	8,080	3,195

Funding: FY 1998: FY98 SBIR Transfer (-\$.106), Federal Technology Transfer (-\$.001), FY1998 Update (+\$.054), and

Minor Pricing Adjustment (-\$.003)

FY 1999: Minor Pricing Adjustment (-\$.027), and Contract and Advisory Assistance (-\$.221)

FY 2000: Countermeasure Adjustment (-\$.300), Outsourcing Adjustment (-\$.006), NWCf Rates (+\$.007), Minor Pricing Adjustment (+\$.005), and No Pay Inflation (-\$.046)

Schedule: Not Applicable

Technical: Not Applicable

C. Other Program Funding Summary:

OPN BLI: 221000/221005

Submarine Acoustic Warfare Systems

FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Complete	Total Cost
3,539	7,296	11,202	10,448	13,691	21,247	30,513	33,296	CONT.	CONT.

D. Acquisition Strategy: Sole Source Contract to Developer for 2 units in FY00, and a one-time Competitive Contract buying out the Backfit market within the FYDP.

E. Schedule Profile: See Next Page

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Exhibit R-3 Cost Analysis		Date: FEB 1999	
APPROPRIATION/BUDGET ACTIVITY RDT&E / BA 7	Program Element Name & No.:		Project Name and Number: Submarine Defensive Warfare Systems / V1265
	Submarine Acoustic Warfare Development / 0101226N		

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date	FY01 Cost	FY01 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development	C/CPAF	Northrop Grumman Norden Systems Melville, NY	31.5	3,250	12/98	.810	11/99			0	35,560	35,560
System Engineering	C/CPAF	General Dynamics Groton, CT	4,778	.939	01/99	0				0	5,717	5,717
System Engineering	WR	PNSY	.730	.100	11/98	0				0	.830	.830
System Engineering	WR	NUWC/DIVNPT Newport, RI		2,245	11/98	.510	11/99			CONT.	CONT.	CONT.
Subtotal Product Development			37,008	6,534		1,320				CONT.	CONT.	CONT.

Remarks:

Award Fees: (FY - Amount Budgeted - % Awarded)
FY92 - \$205,367 - 57%
FY95 - \$63,010 - 49%
FY93 - \$184,830 - 66%
FY94 - \$154,025 - 78%
FY96 - \$271,199 - 88%
FY97 - \$258,198 - 83%

Miscellaneous	WR		0	.696	Var.	0				CONT.	CONT.	CONT.
Subtotal Support			0	.696		0				CONT.	CONT.	CONT.

Remarks:

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Exhibit R-3 Project Cost Analysis
(Exhibit R-3, Page 4 of 5)

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Exhibit R-3 Cost Analysis		Date: FEB 1999	
APPROPRIATION/BUDGET ACTIVITY		Project Name and Number:	
RDT&E / BA 7		Submarine Acoustic Warfare Development / 0101226N	
Submarine Defensive Warfare Systems / V1265			

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total Pys Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date	FY01 Cost	FY01 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	WR	OPTEVFOR Norfolk, VA	.055	0		1.175	11/99			0	1.230	1.230
Subtotal T&E			.055	0		1.175				0	1.230	1.230
Remarks:												
Program Management Support	C/CPFF	RM Vredenburg Reston, VA	.750	.750	12/98	.600	12/99			CONT.	CONT.	CONT.
Travel		PMS415	.110	.100		.100				CONT.	CONT.	CONT.
Subtotal Management			.860	.850		.700				CONT.	CONT.	CONT.
Remarks:												
Total Cost			37.923	8.080		3.195				CONT.	CONT.	CONT.
Remarks:												

R-1 Item No 153 - 5 of 153 - 5

Exhibit R-3 Project Cost Analysis
(Exhibit R-3, Page 5 of 5)

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EXHIBIT R-2, FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0204136N**
PROGRAM ELEMENT TITLE: F/A-18 SQUADRONS

(U) COST: (Dollars in Thousands)

<u>Project Number & Title</u>	<u>FY 1998 Budget</u>	<u>FY 1999 Budget</u>	<u>FY 2000 Estimate</u>	<u>FY 2001 Estimate</u>	<u>FY 2002 Estimate</u>	<u>FY 2003 Estimate</u>	<u>FY 2004 Estimate</u>	<u>FY 2005 Estimate</u>	<u>To Complete</u>	<u>Total Program</u>
E1662 F/A-18 Improvements	45,858	95,583	169,129	118,174	86,874	20,823	36,467	25,191	0	3,268,488
E2065 F/A-18 RADAR Upgrade	2,272	0	3,943	91,526	78,721	91,432	62,876	39,269	31,033	688,071
E2130 F/A-18 Follow-On Variant	237,751	206,450	142,642	28,550	1,512	0	0	0	0	5,598,844
E2350 F/A-18F TAC RECCE	2,817*	0	0	0	0	0	0	0	0	2,817
TOTAL	288,698	302,033	315,714	238,250	167,107	112,255	99,343	64,460	31,033	9,558,220

*F/A-18F TAC RECCE effort executed in P.E. 0305207N starting in FY 1999.

Quantity of RDT&E Articles

10

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The F/A-18 is capable of using external equipment to perform either fighter or attack missions. The capabilities of the F/A-18 weapon system can be upgraded to accommodate and incorporate new or enhanced weapons as well as advances in technology to respond effectively to emerging future threats. Continued development capability is required to successfully optimize new F/A-18 weapon system capabilities in the Fleet. Additionally, continued improvements in reliability and maintainability are necessary to ensure maximum benefit is achieved through reduced cost of ownership and to provide enhanced availability.

F/A-18 Improvements: The F/A-18 Naval Strike Fighter program transitioned from full-scale engineering development to operational systems development during FY 1983. As F/A-18 squadrons report discrepancies and new requirements, a continuing capability is needed to perform technical evaluations, investigative flight testing, software support, and incorporate Pre-Planned Product Improvements (P³) (i.e., capability enhancements).

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Exhibit R-2a, RDT&E Project Justification
(Exhibit R-2a, Page 1 of 24)

EXHIBIT R-2, FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204136N

PROGRAM ELEMENT TITLE: F/A-18 SQUADRONS

The Active Electronically Scanned Array (AESA) development program, beginning in FY 2000, is the last of three pre-planned upgrades to the F/A-18 Type/Model/Series radar. The AESA corrects operational test deficiencies noted in the AN/APG-73. It provides for multi-target tracking, Synthetic Aperture Radar (SAR) imagery, SAR Target Location Error (TLE), and improved spotlight map resolution. In addition, it provides for greater lethality than previous F/A-18 radars by allowing for full tactical support of existing and planned air-to-air (A/A) and air-to-ground (A/G) weapons significantly increases A/A and A/G detection and tracking by ranges. The AESA provides greater survivability through self-protection and standoff jamming capabilities, while its greater range allows for reduced detection by enemy radar. The AESA is also more affordable than previous radars. Significant savings in operating and support costs can be realized through a five fold increase in reliability over the AN/APG-73 as well as incorporating open architecture and Higher Order Language software. Additionally, savings can be realized by avoiding parts obsolescence redesign costs that will be experienced on the AN/APG-65 and AN/APG-73.

F/A-18 Follow-On Variant: The follow-on F/A-18 (E/F version) is an airframe upgrade incorporating increased capabilities, performance, and survivability necessary to satisfy the 41% percent increase in range over the C/D in the high-low-low-high attack/interdiction mission carrying three 480 gallon drop tanks, four 1,000 pound bombs, and two AIM-9 air-to-air missiles. The E/F version will have increased internal fuel capacity, increased weapons carriage capability, increased carrier recovery payload, enhanced survivability/vulnerability, increased growth capacity, and increased engine thrust. It will retain all of the P³J enhancements developed for the earlier night attack C/D version of the aircraft.

F/A-18F TAC RECCE: The F/A-18F Shared Advanced Reconnaissance Pod (SHARP) Program develops podded systems to provide timely, accurate imagery intelligence. This system, when installed on an F/A-18F serves as the follow-on tactical air reconnaissance system to the interim F-14 Tactical Air Reconnaissance Pod System (TARPS). This program funds development of a unique F/A-18F podded reconnaissance system. This system includes electro-optical, infrared, and provisioning for synthetic SAR sensors to provide day/night, broad area coverage and high resolution images in over flight and at short and extended ranges. Imagery data is digitally recorded and can be data linked in near real time and/or returned to base for playback, analysis, processing, and storage. This effort is now funded in P.E. 0305207N (Manned Reconnaissance Systems) starting in FY 1999.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it encompasses engineering and manufacturing development for upgrade of existing operational systems.

E2350 F/A-18F TAC RECCE

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1998 ACCOMPLISHMENTS: (This effort is funded in P.E. 0305207N starting in FY 1999).

- (U) (\$1,000) Solicited and evaluated industry input.
- (U) (\$1,817) Developed draft ORD and program plans.

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7
 PROGRAM ELEMENT: 0204136N
 PROGRAM ELEMENT TITLE: F/A-18 SQUADRONS

PROJECT NUMBER: E1662
 PROJECT TITLE: F/A-18 IMPROVEMENTS

(U) COST: (Dollars in Thousands)

Project Number & Title	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete	Total Program
E1662 F/A-18 Improvements	45,858	95,583	169,129	118,174	86,874	20,823	36,467	25,191	0	3,268,488

Quantity of RDT&E Articles: Not Applicable

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The F/A-18 is a multi-mission strike fighter aircraft that is used in both fighter and attack roles through selected use of external equipment (fuel tanks, targeting/navigation, Forward Looking Infrared (FLIR) pods, and various bomb/missile launching racks). In order to respond effectively to emerging future threats, F/A-18 aircraft capabilities are being upgraded to incorporate new/enhanced weapons systems and avionics including the Positive Identification System (PIDS) (incorporates Congressionally mandated Combined Interrogator Transponder (CIT) Identification Friend or Foe (IFF) System), Digital Communications System (DCS), Joint Helmet Mounted Cueing System (JHMCS), Advanced Targeting Forward Looking Infrared (ATFLIR), conversion of the Operational Flight Program (OFP) to a Higher Order Language (HOL), development of the F/A-18F Advanced Crew Station, initiation of development efforts for Expand 4/5 providing high resolution maps to be displayed in the cockpit, and upgrade of the existing Global Positioning System/Inertial Navigation System in order to meet precision strike/precision approach requirements. Continued hardware/software development is required to successfully optimize fleet F/A-18 weapons systems. As F/A-18 Squadrons report system problems/requirements, a continuing capability is needed to perform technical evaluations/investigative flight testing, provide software support and integrate selected improvements.

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204136N

PROJECT NUMBER: E1662

PROGRAM ELEMENT TITLE: F/A-18 SQUADRONS

PROJECT TITLE: F/A-18 IMPROVEMENTS

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1998 ACCOMPLISHMENTS:

- (U) (\$1,441) Continued to conduct engineering analysis and development improvements to existing systems and subsystems for deficiencies identified during deployment of the aircraft. Provided technical support for the integration of new weapons and systems.
- (U) (\$44,417) Continued development of DCS, PIDS, ATFLIR, and JHMCS.

2. FY 1999 PLAN:

- (U) (\$2,684) Continue to conduct engineering analysis and develop improvements to existing systems and subsystems for deficiencies identified during development of the aircraft. Provide technical support for the integration of new weapons and systems.
- (U) (\$4,548) Continue to develop and integrate enhancements to the effectiveness, operability, and safety of the F/A-18 Weapon System (airframe, avionics, and weapons) and subsystems to include Multifunctional Information Distribution System (MIDS), AIM-9X, Embedded Global Positioning System/Inertial Navigation System (EGI), and Tactical Air Moving Map Capability (TAMMAC). Continue to investigate deficiencies and develop corrective action.
- (U) (\$39,668) Continue development of DCS, PIDS, and JHMCS. Complete Phase I of BOL CHAFF wing tip certification on F/A-18 C/D.
- (U) (\$47,108) Continue ATFLIR development. Commence conversion of the OFP to a HOL.
- (U) (\$1,575) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 68.

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204136N

PROJECT NUMBER: E1662

PROGRAM ELEMENT TITLE: F/A-18 SQUADRONS

PROJECT TITLE: F/A-18 IMPROVEMENTS

3. FY 2000 PLAN:

- (U) (\$1,486) Continue to conduct engineering analysis and develop improvements to existing systems and subsystems for deficiencies identified during development of the aircraft. Provide technical support for the integration of new weapons and systems.
- (U) (\$16,200) Continue development and testing of DCS, JHMCS, and PIDS.
- (U) (\$145,911) Continue ATFLIR development. Continue conversion of the OFP to a HOL and initiate development efforts for the F/A-18E/F Advanced Crew Station, Expand 4/5, and Precision Navigation.
- (U) (\$5,532) Continue to develop and integrate enhancements to the effectiveness, operability, and safety of the F/A-18 Weapon System (airframe, avionics, and weapons) and subsystems to include MIDS, AIM-9X, and TAMMAC. Continue to investigate deficiencies and develop corrective action.

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7
 PROGRAM ELEMENT: 0204136N
 PROGRAM ELEMENT TITLE: F/A-18 SQUADRONS
 PROJECT NUMBER: E1662
 PROJECT TITLE: F/A-18 IMPROVEMENTS

(U) B. PROGRAM CHANGE SUMMARY

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
(U) FY 1999 President's Budget:	45,601	97,198	130,075
(U) Appropriated Value:	47,110	97,198	
(U) Adjustments from President's Budget	+257	-1,615	+39,054
(U) FY 2000 President's Budget Submit:	45,858	95,583	169,129

CHANGE SUMMARY EXPLANATION:

(U) Funding: The net increase of \$257 thousand in FY 1998 reflects an increase to the Positive Identification System (PIDS). The net decrease of \$1,615 thousand in FY 1999 reflects a \$1,000 thousand reprogramming to the VECTOR Program, and a decrease of \$615 thousand for minor pricing adjustments. The net increase in FY 2000 of \$39,054 provides funding for continued development of the Advanced Targeting Forward Looking Infrared (ATFLIR) System, initiation of conversion of the Operational Flight Program (OFP) to a Higher Order Language (HOL), development of the Aft Crew Station for the F/A-18E/F, an increase in NWCF rates, and reduced escalation rates.

(U) Schedule: Not applicable.

(U) Technical: Not applicable

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204136N

PROJECT NUMBER: E1662

PROGRAM ELEMENT TITLE: F/A-18 SQUADRONS

PROJECT TITLE: F/A-18 IMPROVEMENTS

(U) C. OTHER PROGRAM FUNDING SUMMARY

Appn	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete
APN-1 (E/F)	224,350	416,369	382,960	618,946	743,415	842,452	891,283	982,941	3,610,694
APN-5	70,510	134,535	210,428	242,343	220,974	233,362	220,944	215,678	Cont.

Related RDT&E

- (U) P.E. 0207163N Advanced Medium Range Air-to-Air Missile (AMRAAM)
- (U) P.E. 0604727N Joint Stand-off Weapon (JSOW) System
- (U) P.E. 0604270N EW Development
- (U) P.E. 0604777N Navigation ID System, project X0921, NAVSTAR GPS equipment

- (U) D. ACQUISITION STRATEGY: The F/A-18 Improvements program consists of nine separate development projects.

The major programs within the F/A-18 Improvements Line are as follows:

PIDS. PIDS is a sole source cost plus fixed fee contract on an R&D Basic Ordering Agreement. Will be bought as CFE through the prime contractor.

ATFLIR. The ATFLIR development was a sole source incentive fee contract to Boeing. Boeing competed the development contract.

The procurement supplier is planned to be sole source to Boeing.

Higher Order Language (HOL). The conversion of the Operational Flight Program software to HOL will be accomplished by the F/A-18 Advanced Weapons Laboratory at China Lake as the designated Software Support Activity for the F/A-18. The design of the software will be accomplished by Boeing under the sole source Technical Direction Letter contract at China Lake. As the Prime contractor for the aircraft, Boeing is the design agent for software of aircraft in production.

Advanced Crew Station. The design and development of the Advanced Crew Station modification will be sole source to Boeing as the Prime aircraft contractor.

- (U) E. SCHEDULE PROFILE: (not applicable)

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EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0204136N PROJECT NUMBER: E1662 PROJECT TITLE: F/A-18 IMPROVEMENTS

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999		FY 2000		Total Cost	Target Value of Contract
				Cost	Award Date	Cost	Award Date		
PIDS/DCS Development/Integration	SS/CPFF/FFP	MDA St. Louis, MO	79,938	22,830	11/98	11,390	11/99	1,397	115,555
DCS E&MD	SS/FFP	Rockwell-Collins Cedar Rapids, IOWA	16,196	0		0		0	16,196
ATFLIR E&MD	CPI/AF	MDA St. Louis, MO	10,079	31,900	11/98	75,200	11/99	25,945	143,124
ATFLIR AWARD FEE (Note 1)				(2,110)		(1,179)		(1,493)	
Misc. Development Efforts	Various	Other Contracts	5,284	1,200		800		1,200	8,484
JHMCS E&MD	MIPR	WPAFB Dayton, OH	5,000	2,462	11/98	788	11/99	425	8,675
Software Development Engineering	WX	NAWCWD China Lake, CA	38,766	21,414	10/98	70,475	10/99	244,203	374,858
Misc. Product Development	WX	Other Field Activities	2,627	606	10/98	345	10/99	340	3,573
Subtotal Product Development			157,890	80,412		158,998		273,510	670,810

Remarks Note 1: Award Fees included in the total contract value (Award fees are non-add)

Subtotal Support Not Applicable

0 0 0 0 0 0

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BUDGET ACTIVITY: 7 EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS DATE: February 1999

PROGRAM ELEMENT: 0204136N PROJECT NUMBER: E1662

PROJECT TITLE: F/A-18 IMPROVEMENTS

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Product T&E Summary	WX	NAWCAD Patuxent River, MD	40,493	10,666	10/98	8,466	10/99	6,598	66,223	
Subtotal Test & Evaluation			40,493	10,666		8,466		6,598	66,223	
Contractor Support/Travel/Misc	Various	NAVAIR Patuxent River, MD	6,560	2,930	11/98	1,665	11/99	7,421	18,576	
Subtotal Management Services			6,560	2,930		1,665		7,421	18,576	
FY92 & Prior			2,511,304						2,511,304	
SBIR Assessment				1,575					1,575	
Total Cost			2,716,247	95,583		169,129		287,529	3,268,488	

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0204136N** **PROJECT NUMBER: E2065**
PROGRAM ELEMENT TITLE: F/A-18 SQUADRONS **PROJECT TITLE: RADAR UPGRADE**

(U) COST: (Dollars in Thousands)

<u>Project Number & Title</u>	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>To</u>	<u>Total</u>
	<u>Budget</u>	<u>Budget</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Complete</u>	<u>Program</u>
E2065 F/A-18 Radar Upgrade	2,272	0	3,943	91,526	78,721	91,432	62,876	39,269	31,033	688,071

Quantity of RDT&E Articles: Not Applicable

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Active Electronically Scanned Array (AESA) development program, beginning in FY 2000, is the last of three pre-planned upgrades to the F/A-18 Type/Model/Series radar. The AESA corrects operational test deficiencies noted in the AN/APG-73. It provides for multi-target tracking, SAR imagery, SAR TLE, and improved spotlight map resolution. In addition, it provides for greater lethality than previous F/A-18 radars by allowing for full tactical support of existing and planned air-to-air (A/A) and air-to-ground (A/G) weapons significantly increases A/A and A/G detection and tracking ranges. The AESA provides greater survivability through self-protection and standoff jamming capabilities, while its greater range allows for reduced detection by enemy radar. The AESA is also more affordable than previous radars. Significant savings in operating and support costs can be realized through a five fold increase in reliability over the AN/APG-73 as well as incorporating open architecture and Higher Order Language software. Additionally, savings can be realized by avoiding parts obsolescence redesign costs that will be experienced on the AN/APG-65 and AN/APG-73.

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204136N

PROJECT NUMBER: E2065

PROGRAM ELEMENT TITLE: F/A-18 SQUADRONS

PROJECT TITLE: RADAR UPGRADE

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1998 ACCOMPLISHMENTS:

- (U) (\$2,272) Conducted RUG Phase II Follow-on Test and Evaluation.

2. FY 1999 PLAN: Not applicable.

3. FY 2000 PLAN:

- (U) (\$2,900) Conduct Pre E&MD AESA Radar development.
- (U) (\$643) Commence Software Development and Integration efforts.
- (U) (\$350) Commence Radar Development/Planning.
- (U) (\$50) Start Test & Evaluation planning phase.

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DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204136N

PROJECT NUMBER: E2065

PROGRAM ELEMENT TITLE: F/A-18 SQUADRONS

PROJECT TITLE: RADAR UPGRADE

(U) B. PROGRAM CHANGE SUMMARY

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
(U) FY 1999 President's Budget:	2,244	0	0
(U) Appropriated Value:	2,330	0	0
(U) Adjustments from 1999 President's Budget	+28	0	+3,943
(U) FY 2000 President's Budget Submit:	2,272	0	3,943

CHANGE SUMMARY EXPLANATION:

- (U) Funding: The FY1998 increase of \$28 thousand properly funds RUG Phase II requirements in it's last year of development. The FY 2000 increase of \$3,943 thousand consists of a beginning AESA development program.
- (U) Schedule: Not applicable.
- (U) Technical: Not applicable

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

PROJECT NUMBER: E2065
PROJECT TITLE: RADAR UPGRADE

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0204136N**
PROGRAM ELEMENT TITLE: F/A-18 SQUADRONS
(U) C. OTHER PROGRAM FUNDING SUMMARY

<u>Appn</u>	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>To</u>
	<u>Budget</u>	<u>Budget</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Complete</u>
APN-5*	15,112	19,546	42,211	18,946	19,899	4,284	10,275	8,851	93
APN-1C/D*	20,896								
APN-1E/F	54,204	85,671	90,509	105,164	119,815	181,149	198,268	234,547	1,162,072

Related RDT&E

(U) P.E. 0603261N Tactical Airborne Reconnaissance (TAC RECCE)
P.E. 0204136N F/A-18 Squadrons (Project E1662: F/A-18 Improvements – Higher Order Language, Aft Crew Station Upgrade)

(U) D. ACQUISITION STRATEGY: The AESA program employs a two-phase approach with sole source contracts to the airframe prime manufacturer, Boeing. Phase I will be a moderate risk reduction phase conducted in FY 1999 and FY 2000. During this phase, Boeing will conduct competitive source selection at the radar system subcontract level. A BOA order for RFP development and subcontractor selection will be made to conduct this effort. It will include an "845" agreement for prototype development, which includes commercial development/amortization provisions. Conducting the competition early in the program allows for focused risk reduction and contractor investment.

Phase II will consist of a typical E&MD program and development contract. The program transitions to Phase II with a successful Milestone II decision in FY 2001. Once the program enters production, the "845" agreement allows the contractor to amortize unreimbursed development costs into the production unit cost. This strategy fully utilizes acquisition reform initiatives such as: early partnering with industry; alpha contracting; leveraging industry investment; optimizing use of COTS and NDI; cost as an independent variable; and electronic data deliverables.

*RUG Phase I & Phase II

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0204136N PROJECT NUMBER: E2065
PROGRAM ELEMENT TITLE: F/A-18 SQUADRONS PROJECT TITLE: RADAR UPGRADE

(U) E. SCHEDULE PROFILE:

FY 1998 FY 1999 FY 2000 TO COMPLETE

(U) Program Milestones

1Q/PRE E&MD 3Q/06 MS-III

(U) Engineering Milestones

3Q/PDR

(U) T&E Milestones

2Q/TECHEVAL PHASE II
3Q/FOT&E PHASE II

(U) Contract Milestones

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EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204136N PROJECT NUMBER: E2065
PROJECT TITLE: F/A-18 RUG

<u>Cost Categories:</u>	<u>Contract Method & Type</u>	<u>Performing Activity & Location</u>	<u>Total Prior Yrs Cost</u>	<u>FY 1999 Cost</u>	<u>FY 1999 Award Date</u>	<u>FY 2000 Cost</u>	<u>FY 2000 Award Date</u>	<u>Cost to Complete</u>	<u>Total Cost</u>	<u>Target Value of Contract</u>
AESA Radar Contract	SS/TBD	BOEING St. Louis, MO	0	0	0	2,900	11/99	305,802	308,702	308,702
AESA Radar Software Development/Integration	WX	NAWCWD China Lake, CA	0	0	0	643	10/99	59,503	60,146	
AESA Radar Development	WX	NAWCAD Patuxent River, MD	0	0	0	50	10/99	4,460	4,510	
RUG PHASE I	SS/LTR(FPIF)	MDA St. Louis, MO	171,000	0	0	0		0	171,000	171,000
RUG PHASE II	CPIF	MDA St. Louis, MO	51,729	0	0	0		0	51,729	51,729
RUG PHASE II Integration	CPFF	MDA St. Louis, MO	11,000	0	0	0		0	11,000	11,000
Subtotal Product Development			233,729	0	0	3,593		369,765	607,087	
AESA Test & Evaluation	WX	NAWCAD Patuxent River, MD	0	0	0	50	10/99	4,460	4,510	
AESA Radar OPEVAL	WX	OPTEVFOR Norfolk, VA	0	0	0	0		10,621	10,621	

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EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204136N

PROJECT NUMBER:
PROJECT TITLE:

E2065
F/A-18 RUG

<u>Cost Categories:</u>	<u>Contract Method & Type</u>	<u>Performing Activity & Location</u>	<u>Total Prior Yrs Cost</u>	<u>FY 1999 Cost</u>	<u>FY 1999 Award Date</u>	<u>FY 2000 Cost</u>	<u>FY 2000 Award Date</u>	<u>Cost to Complete</u>	<u>Total Cost</u>	<u>Target Value of Contract</u>
RUG Upgrade Test & Evaluation	WX	NAWCWD China Lake, CA	48,014	0	0	0	0	0	48,014	
RUG UPGRADE OPEVAL	WX	COMOPTEVFOR	1,799	0	0	0	0	0	1,799	
RUG Upgrade Test & Evaluation	Various	Other Field Activities	4,815	0	0	0	0	0	4,815	
Subtotal Test & Evaluation			54,628	0	0	50	10/99	15,081	69,759	
AESA Contractor Support /Travel/Misc	Various	NAVAIR Patuxent River, MD	0	0	0	300	0	8,962	9,262	
RUG Contractor Support/Travel/Misc	Various	NAVAIR Patuxent River, MD	1,963	0	0	0	0	0	1,963	
Subtotal Management Services			1,963	0	0	300		8,962	11,225	
Total Cost			290,320			3,943		393,808	688,071	

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7
 PROGRAM ELEMENT: 0204136N
 PROGRAM ELEMENT TITLE: F/A-18 SQUADRONS
 PROJECT NUMBER: E2130
 PROJECT TITLE: FOLLOW-ON VARIANT

(U) COST: (Dollars in Thousands)

<u>Project Number & Title</u>	<u>FY 1998 Budget</u>	<u>FY 1999 Budget</u>	<u>FY 2000 Estimate</u>	<u>FY 2001 Estimate</u>	<u>FY 2002 Estimate</u>	<u>FY 2003 Estimate</u>	<u>FY 2004 Estimate</u>	<u>FY 2005 Estimate</u>	<u>To Complete</u>	<u>Total Program</u>
E2130 Follow-On Variant	237,751	206,450	142,642	28,550	1,512	0	0	0	0	5,598,844

Quantity of RDT&E Articles

10

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The F/A-18 is a twin-engine, mid-wing, multi-mission, tactical aircraft employed in Navy and Marine Corps strike fighter squadrons. The F/A-18, through selected use of external equipment is designed for flexibility in fighter, attack, fleet air defense, and close air support roles. The F/A-18 E/F variant is an upgrade to the night attack "C" and "D" models. The F/A-18E/F will be the second major upgrade since the program's inception. The F/A-18 continues to adapt its strike fighter role to evolving threats into the next century. The F/A-18E/F E&MD program is under a Congressional mandated cost cap of \$4.883B FY90 dollars. Pre-development efforts of \$36.6M (in FY90 base year dollars), previously funded under the F/A-18 C/D program, is reflected in the RDT&E total, but is not included in the approved \$4.883B development cap.

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DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204136N

PROJECT NUMBER: E2130

PROGRAM ELEMENT TITLE: F/A-18 SQUADRONS

PROJECT TITLE: FOLLOW-ON VARIANT

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1998 ACCOMPLISHMENTS:

- (U) (\$139,792) Continued engineering and manufacturing design activity in support of developmental flight test.
- (U) (\$8,651) Continued to develop ground test support for integration; conducted Navy Program Review (NPR); completed engine Full Production Qualification (FPQ), and continued to procure GFE items required for developmental efforts.
- (U) (\$87,308) Continued developmental flight testing; completed Developmental Test and Evaluation (DT-IIB) testing; started DT-IIC; started Operational Test & Evaluation (OT-IIA and OT-IIB).
- (U) (\$2,000) Begin Test Program Set (TPS) development.

2. FY 1999 PLAN:

- (U) (\$137,490) Continue engineering and manufacturing design activity in support of developmental flight test.
- (U) (\$3,108) Continue to develop ground test support for integration as well as ongoing test and evaluation efforts.
- (U) (\$56,106) Continue developmental flight testing, begin and complete DT-IID (TECHEVAL), and start DT-IIE and OT-IIC (OPEVAL).
- (U) (\$6,000) Continue Test Program Set (TPS) development.
- (U) (\$3,746) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

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DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204136N

PROJECT NUMBER: E2130

PROGRAM ELEMENT TITLE: F/A-18 SQUADRONS

PROJECT TITLE: FOLLOW-ON VARIANT

3. FY 2000 PLAN:

- (U) \$87,200) Complete engineering and manufacturing design activity in support of developmental flight test and prepare for Milestone-III (MS-III) Decision Acquisition Board (DAB).
- (U) (\$3,587) Continue ground testing support for integration as well as ongoing test and evaluation efforts.
- (U) (\$41,855) Complete DT-IIIE and OT-IIIC (OPEVAL) and start OT-IIIA.
- (U) (\$10,000) Continue Test Program Set (TPS) development.

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7
PROGRAM ELEMENT: 0204136N
PROGRAM ELEMENT TITLE: F/A-18 SQUADRONS

PROJECT NUMBER: E2130
PROJECT TITLE: FOLLOW-ON VARIANT

(U) B. PROGRAM CHANGE SUMMARY

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
(U) FY 1999 President's Budget:	260,068	216,607	145,214
(U) Appropriated Value:	241,536	216,607	
(U) Adjustments from 1999 President's Budget:	-22,317	-10,157	-2,572
(U) FY 2000 President's Budget Submit	237,751	206,450	142,642

CHANGE SUMMARY EXPLANATION:

- (U) Funding: The net decrease of -\$22,317 thousand in FY 1998 represents a reversal of anticipated reprogramming for EMD assumed in the President's Budget and -\$3,683 thousand for reprogramming to other priorities. FY 1999 net decrease of -\$10,157 thousand is the result of -\$1,000 thousand for BTR 63105 for the VECTOR program, a -\$5,000 thousand congressional adjustment, a -\$498 thousand revised economic assessment and a -\$3,659 balancing adjustment. The decrease in FY2000 of -\$2,572 thousand is the result of an inflation adjustment of -\$2,070 thousand and -\$502 thousand for balancing adjustments.
- (U) Schedule: FY1998 Full Production Qualification (FPQ) 4Q/98 moved to 1Q/99 to allow the test team time to fully develop the planned corrections required to address the F414 pop stall issues.
- (U) FY 1999 Navy Program Review (NPR) 1Q/99 moved to 2Q/99 to allow for completion of F414 FPQ which was the last remaining exit criteria.
- (U) Schedule: FY1998 1Q/OT-IIA, 3Q-4Q/OT-IIIB were left off the FY 1999 President's Budget submit in error. The LRIP Contract Milestones were removed from the RDT&E Budget and are reflected in the F/A-18E/F APN budget.
- (U) Technical: Not Applicable.

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204136N

PROJECT NUMBER: E2130

PROGRAM ELEMENT TITLE: F/A-18 SQUADRONS

PROJECT TITLE: FOLLOW-ON VARIANT

(U) C. OTHER PROGRAM FUNDING SUMMARY

Appn	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete
(U) A/C QTY	20	30	36	42	48	48	48	48	216
(U) APN1	2,106,362	2,870,628	2,854,229	2,890,594	3,073,708	3,105,247	3,242,645	3,344,223	14,057,797
(U) APN6	80,246	101,087	69,543	129,531	125,744	51,403	54,330	79,650	243,749

Related RDT&E

- (U) PE 0207163N (AMRAAM)
- (U) PE 0604727N (Joint Standoff Weapon System) (JSOW)
- (U) PE 0604270N (EW Development)
- (U) PE 0604777N (Navigation/ID System)
- (U) PE 0305141D (Joint UAV)
- (U) PE 0603261N (Tactical Airborne Reconnaissance)
- (U) PE 0204163N (Fleet Communications)

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0204136N PROJECT NUMBER: E2130
 PROGRAM ELEMENT TITLE: F/A-18 SQUADRONS PROJECT TITLE: FOLLOW-ON VARIANT

(U) D. ACQUISITION STRATEGY: The July 1992 award of the two RDT&E,N contracts to MDA (airframe) and General Electric (engine), both sole source cost plus incentive fee/award fee, effectively initiated the F/A-18E/F E&MD program. The airframe and engine contracts are incrementally funded through FY00 and FY99, respectively. In March 1997, the F/A-18E/F program received approval to enter the Low Rate Initial Production (LRIP) phase. The airframe and engine contracts for this phase are Cost Plus Incentive Fee (CPIF) for LRIP I and Fixed Price Incentive Fee (FPIF) for LRIP II and LRIP III. LRIP III is a priced option to the LRIP II contract. The LRIP II/III contract possesses a common incentive profit structure which affords contractors maximum opportunity to implement quality, reliability, and producibility improvements. Benefits of the F/A-18E/F LRIP contracts include: 1) a measurable profit incentive across the LRIP period of performance; 2) commercial-like long time relationship with contractors which tie customer (fleet) satisfaction to long term profitability; 3) progressive assumption of risk by the contractors; 4) a single negotiation for LRIP II and III.

(U) E. SCHEDULE PROFILE

FY 1998

FY 1999

FY 2000

(U) Program Milestones

3Q/NPR

2Q/NPR

2Q/MS-III
4Q/IOC

(U) Engineering Milestones

1Q/ENG FPQ

(U) T&E Milestones

1Q/OT-IIA
3Q-4Q/OT-IIIB
3Q-4Q/DT-IIIC

1Q-2Q/DT-IIID
(TECHEVAL)
3Q/99 -1Q/00 OT-IIIC
(OPEVAL)

(U) Contract Milestones

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EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204136N

PROJECT NUMBER: E2130
PROJECT TITLE: FOLLOW-ON VARIANT

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999		FY 2000		Total Cost	Target Value of Contract
				Cost	Award Date	Cost	Award Date		
Pre-E&MD Activity	SS/CPFF	MDA	81,785	0		0		81,785	81,785
*Airframe E&MD	SS/CPFF/ AF	St. Louis, MO MDA St. Louis, MO	3,649,642 (134,911)	131,490 (61,364)	11/98	87,200 (85,995)	11/99	3,868,332	3,868,332
Airframe E&MD AWARD FEE (Note 1) non-add Contract OPEVAL Support	CPFF/BOA	MDA	7,910	6,000	11/98	0		13,910	13,910
*Pre-E&MD Activity	SS/CPFF	St. Louis, MO GE	51,500	0		0		51,500	51,500
Engine E&MD	SS/CPFF/ AF	Lynn, MA GE Lynn, MA	818,590 (49,455)	0		0		818,590	818,590
Engine E&MD AWARD FEE (Note 1) non-add Radar Integration	SS/CPFF	HUGHES LA, CA	6,329	0		0		6,329	6,329
Miscellaneous Development Efforts	Various	Other Contracts	20,619	0		0		20,619	20,619
Materials Development	WX	NAWCAD	26,351	0		0		26,351	
Software Development	WX	Warminster, PA NAWCWD	52,159	2,028	10/98	2,615	10/99	59,274	
Support Equipment Development	WX	China Lake, CA NAWCAD	29,584	6,000	10/98	10,000	10/99	52,784	
Maintenance Support Planning	WX	Lakehurst, NJ NADEP	10,540	0		0		10,540	
Avionics Support	WX	North Island, CA NAWCAD	9,502	0		0		9,502	
Misc. Product Development/GFE	WX	Indianapolis, IN Other Field Activities	113,905	0		0		113,905	
Subtotal Product Development			4,878,416	145,518		99,815		9,672	5,133,421

Remarks Note 1: Award Fees included in the total contract value (Award fees are non-add)

*To date, 94% of the planned airframe award fee has been awarded and 95% of the planned engine award fee has been awarded.

Subtotal Support Not Applicable

0 0 0 0 0 0

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EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204136N

PROJECT NUMBER: E2130

PROJECT TITLE: FOLLOW-ON VARIANT

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	Cost to Complete	Total Cost	Target Value of Contract
OPEVAL	WX	OPTEVFOR Norfolk, VA	2,411	12,704	11/98	0		0	15,115	
Flying Qualities and Performance	MIPR	NASA	7,156	0		0		0	7,156	
Integrated Test Team	WX	Langley, AFB NAWCAD Patuxent River, MD	239,064	36,851	11/98	36,586	10/99	16,645	329,146	
Wind Tunnel	MIPR	Arnold Eng Development Center(AEDC) Tullahoma, TN	33,751	2,000	11/98	2,000	10/99	0	37,751	
Misc Test & Evaluation	Various	Other Field Activities	13,219	0		0		0	13,219	
Subtotal Test & Evaluation			295,601	51,555		38,586		16,645	402,387	
Contractor Support/Travel/Misc	Various	NAVAIR Patuxent River, MD	45,673	5,631	11/98	4,241	10/99	3,745	59,290	
Subtotal Management SBIR Assessment			45,673	5,631 3,746		4,241		3,745	59,290 3,746	
Total Cost			5,219,690	206,450		142,642		30,062	5,598,844	

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EXHIBIT R-2, FY 2000 RDT&E,N PRESIDENT'S BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204152N

PROGRAM ELEMENT TITLE: E-2 SQUADRONS

(U) COST: (Dollars in Thousands)

Project Number & Title	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete	Total Program
E0463 - (E-2C Improvements)	36,985	9,783	4,048	6,544	6,570	6,805	6,999	7,174	continued	continued
E2321 - (E-2 Radar Modernization)	21,318	36,839	12,084	6,397	6,846	0	0	0	0	83,484
TOTAL	58,303	46,622	16,132	12,941	13,416	6,805	6,999	7,174	continued	continued
Quantity of RDT&E Articles	1	0	0	0	0	0	0	0	0	0

(U)A. **MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:** E-2C Improvements provides pre-planned product improvements for the evolution of E-2C airborne weapon system capabilities in support of naval warfare command and control requirements. It has previously funded developments for the modification/replacement of selected weapon replaceable assemblies of current installed subsystems. This has resulted in a new baseline capability configuration referred to as Group II aircraft. The program has developed a Mission Computer Upgrade (MCU), applying on-going developments in data processing and target detection, which will relieve current bottlenecks in signal and data processing. The MCU will permit incorporation of additional functional capabilities to satisfy evolving operational requirements, e.g., Cooperative Engagement Capability (CEC), Satellite Communications (SATCOM), and permits the evolutionary growth of a Cruise Missile Defense (CMD) capability. The test article in FY98 is an MCU Engineering Manufacturing Development (EMD) Unit.

FY00-05: Technology insertion of new emergent systems and subsystems. This initiative allows for data collection and the evaluation of new technologies in the context of emerging missions and requirements including Cruise Missile Defense, Ballistic Missile Defense, littoral warfare, combat identification, and Single Integrated Air Picture as well as parts and systems obsolescence. Emphasis will be upon the following areas: participation in exercises to assess capabilities against emerging threats; identify deficiencies; identification of candidate solutions; and ground/airborne demonstrations of the identified technologies.

The Radar Modernization Program (RMP) is a Non-Acquisition Advanced Technology Transition Demonstration (ATTD). It initiates the application of new radar technologies which can be common to both seabased and landbased airborne early warning platforms, E-2C and E-3, to provide a definitive littoral Theater Air Missile Defense (TAMD) capability. Focused technologies developed in association with the RMP will be cost shared by the Navy and Air Force. Funding shown in the RMP includes the Navy cost share. Key technologies to be applied are Space-Time Adaptive Processing, an electronically scanable radar antenna with multi-channel rotary coupler, a solid state radar transmitter, and high dynamic range digital receivers. The resulting detection system will specifically provide an improved overland capability for TAMD, advanced auto detect and track, a single beam cue to a shooter, Non-Cooperative Target Recognition classification technologies, and continue to enhance E-2C CEC capabilities. These technologies and resultant equipment, demonstrated in ground environment in FY 1997, will also demonstrate in FY 1999, and be flight tested in FY 2001 and FY 2002 leading to an engineering change proposal (ECP) anticipated to start in 2003 for introduction into fleet aircraft.

(U) **JUSTIFICATION FOR BUDGET ACTIVITY:** This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it encompasses engineering and manufacturing development for upgrade of existing operational systems.

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EXHIBIT R-2a, FY 2000 RDT&E,N PRESIDENT'S BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROJECT NUMBER: E0463

PROGRAM ELEMENT TITLE: E-2 Squadrons

PROJECT TITLE: E-2C Improvements

(U) COST: (Dollars in Thousands)

<u>Project Number & Title</u>	<u>FY 1998 Budget</u>	<u>FY 1999 Budget</u>	<u>FY 2000 Estimate</u>	<u>FY 2001 Estimate</u>	<u>FY 2002 Estimate</u>	<u>FY 2003 Estimate</u>	<u>FY 2004 Estimate</u>	<u>FY 2005 Estimate</u>	<u>To Complete</u>	<u>Total Program</u>
E0463 - (E-2C Improvements)	36,985	9,783	4,048	6,544	6,570	6,805	6,999	7,174	continued	continued

Quantity of RDT&E Articles **1**

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: E-2C Improvements provides pre-planned product improvements for the evolution of E-2C airborne weapon system capabilities in support of naval warfare command and control requirements. It has previously funded developments for the modification/replacement of selected weapon replaceable assemblies of current installed subsystems. This has resulted in a new baseline capability configuration referred to as Group II aircraft. The program has developed a Mission Computer Upgrade (MCU), applying on-going developments in data processing and target detection, which will relieve current bottlenecks in signal and data processing. The MCU will permit incorporation of additional functional capabilities to satisfy evolving operational requirements, e.g., Cooperative Engagement Capability (CEC), Satellite Communications (SATCOM), and permits the evolutionary growth of a Cruise Missile Defense (CMD) capability. The test article in FY98 is an MCU Engineering Manufacturing Development (EMD) Unit.

FY00-05: Technology insertion of new emergent systems and subsystems. This initiative allows for data collection and the evaluation of new technologies in the context of emerging missions and requirements including Cruise Missile Defense, Ballistic Missile Defense, littoral warfare, combat identification, and Single Integrated Air Picture as well as parts and systems obsolescence. Emphasis will be upon the following areas: participation in exercises to assess capabilities against emerging threats; identify deficiencies; identification of candidate solutions; and ground/airborne demonstrations of the identified technologies.

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EXHIBIT R-2a, FY 2000 RDT&E,N PRESIDENT'S BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204152N

PROGRAM ELEMENT TITLE: E-2 SQUADRONS

PROJECT NUMBER: E0463

PROJECT TITLE: E-2C IMPROVEMENTS

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1998 ACCOMPLISHMENTS:

1

- (U) \$7,350k - Conducted DT/OT IIB
- (U) \$5,192k - Completed CEC software interface
- (U) \$5,568k - Completed Software System test for Build 1. Initiated Build 2.
- (U) \$14,481k - Completed DT/OT-IIC Formal Qualification Testing.
- (U) \$1,025k - Conducted Test Readiness Review for FY99 Technical Evaluation/Operational Evaluation (TECHEVAL/OPEVAL)
- (U) \$3,369k - Completed test aircraft modifications.

2. FY 1999 PLAN:

- (U) \$3,561k - Complete software system test for Build 2.
- (U) \$432k - Conduct Production Readiness Review.
- (U) \$5,715k - Conduct MCU TECHEVAL/OPEVAL.
- (U) \$75k - Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. FY 2000 PLAN:

- (U) \$4,048k - Collect sensor data. Down select technologies for demonstration. Perform demonstration of selected systems.

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EXHIBIT R-2a, FY 2000 RDT&E,N PRESIDENT'S BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204152N

PROGRAM ELEMENT TITLE: E-2 SQUADRON

PROJECT NUMBER: E0463

PROJECT TITLE: E-2C IMPROVEMENTS

(U) B. PROGRAM CHANGE SUMMARY

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
(U) FY 1999 President's Budget:	37,974	10,439	4,121
(U) Appropriated Value:	39,380	10,439	
(U) Adjustments from 1999 Pres Budget:	-989	-656	-73
(U) FY2000 PRES Budget Submit:	36,985	9,783	4,048

CHANGE SUMMARY EXPLANATION:

(U) Funding –

FY1998 decrease reflects a Small Business Innovation Research reduction of \$1,589k & a Below Threshold Reprogramming increase of \$600k.

FY1999 decrease reflects a \$24k reduction for Revised Economic Assumption, a \$15k reduction for minor pricing adjustments, and a \$617k reduction for CAAS.

FY2000 decrease reflects a -\$73k reduction for minor pricing adjustments.

(U) Schedule – Not Applicable.

(U) Technical – Not Applicable.

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EXHIBIT R-2a, FY 2000 RDT&E,N PRESIDENT'S BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204152N

PROJECT NUMBER: E0463

PROGRAM ELEMENT TITLE: E-2C SQUADRONS

PROJECT TITLE: E-2C IMPROVEMENTS

(U) C. OTHER PROGRAM FUNDING SUMMARY

	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To
Appn	Budget	Budget	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Complete
APN 1/E-2C (LI #10 & 11)	311,569	397,278	383,016	315,917	260,991	211,730	0	0	0
APN 5/E-2C (LI #33)	44,005	83,563	28,201	26,907	14,802	2,878	65,638	65,502	0
APN 6/E-2C (LI #46)	6,017	16,978	12,497	4,968	7,617	10,114	0	0	0

Related RDT&E

(U) 0603658N (Ship Self Defense, Cooperative Engagement)

(U) C. ACQUISITION STRATEGY: Work will be led in-house. Necessary contractor support will be acquired in conjunction with already existing contracts.

(U) D. SCHEDULE PROFILE

FY 1998 FY 1999 FY 2000 TO COMPLETE

(U) Program Milestones

1Q MCU OPEVAL
3Q MCU MSIII

(U) Engineering Milestones

(U) T&E Milestones

2Q/3Q MCU Qual
Tests
3Q MCU DT/OT-IIB

2Q MCU DT/OT-IIB
4Q MCU DT/OT-IIC
4Q MCU TECHEVAL

Ground
Demo

2Q MCU FRP

(U) Contract Milestones

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DATE: February 1999

EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0204152N PROJECT NUMBER: E0463 PROJECT TITLE: E-2C IMPROVEMENTS

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999		FY 2000		Cost to Complete	Total Cost	Target Value of Contract
				Cost	Award Date	Cost	Award Date			
PRODUCT DEVELOPMENT										
Hardware/Software Develop. - MCU	SS/CPFF	GAC, NY/FL	149,351	5,715	12/98	0	0	0	155,066	155,066
Hardware/Software Develop. - CEC/MCU	SS/CPFF	GAC, NY/FL	12,194	0		0	0	0	12,194	12,194
Hardware/Software Develop. - MCU	SS/CPFF	GAC, NY/FL	13,898	0		0	0	0	13,898	13,898
Hardware/Software Develop. Misc.- MCU	SS/CPFF	GAC, NY/FL	1,021	0		0	0	0	1,021	1,021
Hardware/Software Dev.-Prior Yr. Efforts		GAC, NY/FL	254,800	0		0	0	0	254,800	254,800
Subtotal Product Development			431,264	5,715		0	0	0	436,979	
SUPPORT										
Government Eng Support - MCU	WX/RC	NAWCAD PAX, MD	9,103	50	10/98	0	0	0	9,153	
Gov't Eng Support - Prior Yr. Efforts	WX/RC	NAWCAD PAX, MD	58,800	0		0	0	0	58,800	
Government Eng Support (Air 4.2) -MCU	WX	NAWCAD PAX, MD	247	150	10/98	0	0	0	397	
Subtotal Support			68,150	200		0	0	0	68,350	

GAC = GRUMMAN AEROSPACE CORPORATION

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Exhibit R-3, RDT&E Cost Analysis
(Exhibit R-3, Page 6 of 13)

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DATE: February 1999

EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204152N

PROJECT NUMBER: E0463
PROJECT TITLE: E-2C IMPROVEMENTS

<u>Cost Categories:</u>	<u>Contract Method & Type</u>	<u>Performing Activity & Location</u>	<u>Total Prior Yrs Cost</u>	<u>FY 1999 Cost</u>	<u>FY 1999 Award Date</u>	<u>FY 2000 Cost</u>	<u>FY 2000 Award Date</u>	<u>Cost to Complete</u>	<u>Total Cost</u>	<u>Target Value of Contract</u>
<u>TEST & EVALUATION</u>										
Test & Evaluation - MCU	WX/RC	NAWCAD PAX	25,343	1,528	10/98	0		0	26,871	
Test & Evaluation - MCU	WX	NAWCAD PAX	10,270	2,215	10/98	0		0	12,485	
Test & Evaluation - (Prior Yr. Effort)	WX	NAWCAD PAX	39,200	0		0		0	39,200	
Test & Evaluation - MCU	WX	PMRF, HAWAII	1,500	0		0		0	1,500	
Miscellaneous - MCU	MIPR	VARIOUS	670	0		0		0	670	
Test & Evaluation - IMPROV	WX/RC	NAWCAD PAX	0	0	10/99	684	10/99	4,373	5,057	
Test & Evaluation - IMPROV	WX	NAWCAD PAX	0	0	10/99	684	10/99	Continued	Continued	
Test & Eval. - CONTRACT /IMPROV	PD	TBD	0	0	10/99	2,680	10/99	21,716	24,396	24,396
Subtotal Test & Evaluation			76,983	3,743		4,048		Continued	Continued	
<u>MANAGEMENT</u>										
Management Support Services	WX/RX	NAWCAD PAX, MD	91	0	10/98	0		0	91	
TRAVEL	WX	NAWCAD PAX, MD	116	50	10/98	0		0	166	
Subtotal Management			207	50		0		0	257	
SBIR Assessment				75		0		0	75	
GRAND TOTAL			576,604	9,783		4,048		Continued	Continued	

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DATE: February 1999

EXHIBIT R-2a, FY 2000 RDT&E,N PRESIDENT'S BUDGET PROJECT JUSTIFICATION SHEET

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204152

PROJECT NUMBER: E2321

PROGRAM ELEMENT TITLE: E-2 SQUADRONS

PROJECT TITLE: RADAR MODERNIZATION PROGRAM

(U) COST: (Dollars in Thousands)

<u>Project Number & Title</u>	<u>FY 1998 Budget</u>	<u>FY 1999 Budget</u>	<u>FY 2000 Estimate</u>	<u>FY 2001 Estimate</u>	<u>FY 2002 Estimate</u>	<u>FY 2003 Estimate</u>	<u>FY 2004 Estimate</u>	<u>FY 2005 Estimate</u>	<u>To Complete</u>	<u>Total Program</u>
E2321 E-2 RADAR MODERNIZATION PROGRAM	21,318	36,839	12,084	6,397	6,846	0	0	0	0	83,484
TOTAL	21,318	36,839	12,084	6,397	6,846	0	0	0	0	83,484

Quantity of RDT&E Articles: Not applicable.

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Radar Modernization Program (RMP) is a Non-Acquisition Advanced Technology Transition Demonstration (ATTD). It initiates the application of new radar technologies which can be common to both seabased and landbased airborne early warning platforms, E-2C and E-3, to provide a definitive littoral Theater Air Missile Defense (TAMD) capability. Focused technologies developed in association with the RMP will be cost shared by the Navy and Air Force. Funding shown in the RMP includes the Navy cost share. Key technologies to be applied are Space-Time Adaptive Processing, an electronically scanable radar antenna with multi-channel rotary coupler, a solid state radar transmitter, and high dynamic range digital receivers. The resulting detection system will specifically provide an improved overland capability for TAMD, advanced auto detect and track, a single beam cue to a shooter, Non-Cooperative Target Recognition classification technologies and continue to enhance E-2C CEC capabilities. These technologies and resultant equipment, demonstrated in ground environment in FY 1997, will also demonstrate in FY 1999, and be flight tested in FY 2001 and FY 2002 leading to an engineering change proposal (ECP) anticipated to start in 2003 for introduction into fleet aircraft.

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Exhibit R-2a, RDT&E Project Justification
(Exhibit R-2a, Page 8 of 13)

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EXHIBIT R-2a, FY 2000 RDT&E,N PRESIDENT'S BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204152

PROGRAM ELEMENT TITLE: E-2 SQUADRONS

PROJECT NUMBER: E2321

PROJECT TITLE: RADAR MODERNIZATION PROGRAM

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1998 ACCOMPLISHMENTS:

- (U) \$5,548k - Developed the advanced common form factor modules for TAMd.
- (U) \$9,093k - Procured off the shelf flight test instrumentation.
- (U) \$3,346k - Start the integration and checkout (IACO) of flight instrumentation package for planned FY99 ground test.
- (U) \$3,331k - Completed aircraft integration concept design.

2. FY 1999 PLAN:

- (U) \$3,122k - Risk reduction, testing and data analysis of form factor modules.
- (U) \$4,421k - Complete integration and checkout of flight instrumentation package.
- (U) \$7,403k - Conduct ground testing at Pacific Missile Range Facility (PMRF).
- (U) \$5,478k - Design aircraft installation provisions for transition of flight hardware from ground tests to flight test vehicle.
- (U) \$4,187k - Conduct final design review.
- (U) \$11,337k - Initiate modification and fabrication of hardware for installation in flight vehicle C-130.
- (U) \$891k - Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

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DATE: February 1999

EXHIBIT R-2a, FY 2000 RDT&E,N PRESIDENT'S BUDGET PROJECT JUSTIFICATION SHEET

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204152

PROGRAM ELEMENT TITLE: E-2 SQUADRONS

PROJECT NUMBER: E2321

PROJECT TITLE: RADAR MODERNIZATION PROGRAM

3. FY 2000 PLAN:

- (U) \$4,906k - Complete modification and fabrication of hardware and installation provisions in C-130.
- (U) \$7,178k - Start the IACO of full flight test system in C-130.

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DATE: February 1999

EXHIBIT R-2a, FY 2000/2001 RDT&E,N PRESIDENT'S BUDGET PROJECT JUSTIFICATION SHEET

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204152

PROJECT NUMBER: E2321

PROGRAM ELEMENT TITLE: E-2 SQUADRONS

PROJECT TITLE: RADAR MODERNIZATION PROGRAM

(U) B. PROGRAM CHANGE SUMMARY

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
(U) FY 1999 President's Budget:	24,556	37,358	20,659
(U) Appropriated Value:	25,472	37,358	
(U) Adjustments from 1999 Pres Budget:	-3,238	-519	-8,575
(U) FY 2000 OSD Budget Submit:	21,318	36,839	12,084

CHANGE SUMMARY EXPLANATION:

(U) Funding:

FY1998 decrease reflects a \$1,038k reduction for SBIR, and a \$2,200k reduction due to a BTR to assist SH-60R ALFS.

FY1999 decrease reflects an \$86k reduction due to a Revised Economic Assumption, a \$6k reduction for minor pricing adjustments, and a \$427k reduction for CAAS.

FY2000 decrease reflects a net reduction of -\$8,395k due to a rescope of RMP, as well as -\$180K for minor pricing adjustments.

(U) Schedule: Program plan adjustments for FY1998 through FY2000 reflect a restructured integrated schedule.

(U) Technical: Not applicable.

EXHIBIT R-2a, FY 2000 RDT&E,N PRESIDENT'S BUDGET PROJECT JUSTIFICATION SHEET

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DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204152

PROJECT NUMBER: E2321

PROGRAM ELEMENT TITLE: E-2 SQUADRONS

PROJECT TITLE: RADAR MODERNIZATION PROGRAM

(U) C. OTHER PROGRAM FUNDING SUMMARY: Not applicable

(U) Related RDT&E

(U) PE 0603238N (Global Surveillance Precision Strike and Advanced Technology) will fund the R&D effort to integrate existing RMP technologies at the Pacific Missile Range Facility (PMRF) for inclusion in TAMD.

(U) C. ACQUISITION STRATEGY: Not Applicable.

(U) D. SCHEDULE PROFILE: Not applicable. Non-acquisition program.

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DATE: February 1999

EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204152

PROJECT NUMBER: E2321

PROJECT TITLE: RADAR MODERNIZATION PROGRAM

<u>Cost Categories:</u>	Contract Method	Performing Activity & Location	Total Prior Yrs	FY 1999		FY 2000		FY 2000		Total	Cost to		Target Value of
				Cost	Date	Cost	Date	Cost	Date		Complete	Contract	
PRODUCT DEVELOPMENT													
Hardware/Software Develop.	SS/CPFF	CLASSIFIED	19,462	14,306	10/98	0		0			1,184	34,952	34,952
Hardware/Software Develop.	SS/CPFF	GAC, NY	0	17,942	11/98	9,684	10/99	9,684	10/99	30,185	2,559	30,185	30,185
Hardware/Software Develop.	MIPR	HANSCOMB AFB, MA	748	0		0		0		748	0	748	748
Hardware/Software Develop.	SS/CPFF	KIRKLAND AFB, TX	476	0		0		0		476	0	476	476
Subtotal Product Development			20,686	32,248		9,684		9,684		66,361	3,743	66,361	
SUPPORT													
Government Engineering Support	WR/WX	NAWCAD PAX, MD	332	1,465	10/98	550	10/99	550	10/99	3,497	1,150	3,497	
Studies, Analysis, & Evaluation	CPFF	CLASSIFIED	332	150	10/98	165	10/99	165	10/99	660	345	660	660
Subtotal Support			332	1,615		715		715		4,157	1,495	4,157	
TEST & EVALUATION													
Test & Evaluation	WX/WR	NAWCAD PAX, MD	0	1,700	10/98	1,300	10/99	1,300	10/99	10,200	7,200	10,200	
Engineering & Tech Services	CPFF	CLASSIFIED	265	300	10/98	330	10/99	330	10/99	1,585	690	1,585	1,585
Subtotal Test & Evaluation			265	2,000		1,630		1,630		11,785	7,890	11,785	
MANAGEMENT													
Management Support Service	CPFF	CLASSIFIED	0	50	10/98	55		55		220	115	220	220
Travel	WX	NAWCAD PAX, MD	35	35	10/98	0		0		70	0	70	
Subtotal Management			35	85		55		55		290	115	290	
SBIR Assessment													
				891		0		0		891	0	891	
Total Cost			21,318	36,839		12,084		12,084		83,484	13,243	83,484	

R-1 Item No. 155
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FY 2000 President's Budget Estimates

Exhibit R-2, RDT&E,N Budget Item Justification

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204163N

PROGRAM ELEMENT TITLE: FleetCommunications

COST (\$ in Thousands)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
X0725 Communication Automation	708	1,798	1,147	1,884	1,931	1,980	2,028	2,077	CONT	CONT
X2074 Communication Support Systems	1,505	0	0	0	0	0	0	0		
X1083 Shore to Ship Communications System	11,830	13,592	8,108	7,763	6,898	7,090	7,257	7,427	CONT	CONT
X0795 Support of MEECN	452	722	692	706	719	733	750	767	CONT	CONT
Total P.E. Cost	14,495	16,112	9,947	10,353	9,548	9,803	10,035	10,271	CONT	CONT

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

The Communications Automation Program (NAVMACS II/SMS) develops joint/combined individual and organizational message handling to US Naval ships, USMC Vans, and selected MSC and USCG platforms. NAVMACS II/SMS develops fleet interface to DMS and legacy ashore messaging systems. The Communications Support Systems (CSS) develops the architecture for an integrated Navy communication system for Ship-to-Shore and Shore-to-Ship communications defined as the Copernicus TADIXS and prototypes early operational capabilities and incremental implementation and fielding of CSS capabilities. The Shore to Ship Communications System develops communications systems elements which provide positive command and control of deployed ballistic missile submarines (SSBNs). Minimum Essential Emergency Communications Network (MEECN) is the Tri-Service transmission system which ensures delivery of Emergency Action Messages (EAM) to our strategic platforms.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it encompasses engineering and manufacturing development for upgrade of existing, operational systems

B. (U) PROGRAM CHANGE SUMMARY: FY 1998: Reflects a \$-259K SBIR reduction, a FY98 Update -\$674K, C41 RDT&E,N Expenditure Carryover - \$70K, \$-2,272K BTR reduction, and \$1,809 Pending Reprogramming. FY 99-00: Reflects a \$+300K increase due to realignment of TACAMO funding to CEP, a \$-698K reduction for C41 expenditure carryover, and \$-174 miscellaneous reductions.

C. (U) OTHER PROGRAM FUNDING SUMMARY: See individual projects.

D. (U) ACQUISITION STRATEGY: See individual projects.

R-1 Shopping List - Item No 156-1 of 156-16

UNCLASSIFIED

Exhibit R-2, RDT&E,N Budget Item Justification

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FY 2000 President's Budget Estimates

Exhibit R-2, RDT&E,N Budget Item Justification

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204163N

PROGRAM ELEMENT TITLE: FleetCommunications

E. (U) SCHEDULE PROFILE: See individual projects.

R-1 Shopping List - Item No 156-2 of 156-16

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Exhibit R-2, RDT&E,N Budget Item Justification

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FY 2000 President's Budget Estimates

Exhibit R-2a, RDT&E,N Project Justification

Date: FEB 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204163N

PROGRAM ELEMENT TITLE: FleetCommunications

PROJECT NUMBER: (X0725)

PROJECT TITLE: Communication Automation

Cost (\$ in Thousands)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
X0725 Communications Automation	708	1,798	1,147	1,884	1,931	1,980	2,028	2,077	CONT	CONT

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

This project is a continuing program that provides for automation and communications upgrades for Fleet tactical users. The Naval Modular Automated Communications System II (NAVMACS II) is the network centric Single Messaging Solution (SMS) for the processing, storage, distribution and forwarding of DMS organizational and individual messages to the user's desktop throughout the IT-21 LAN/WAN.

PROGRAM ACCOMPLISHMENTS AND PLANS:

• FY 1998 ACCOMPLISHMENTS:

(\$708) NAVMACS II/SMS: Continued DMS Tactical Afloat efforts. Continued accommodation to C3 technology. Integrated PC technology. Drafted SMS CONOPS. Began SMS product evaluation. Developed SMS test strategy, test plan and test schedule. Began development of design documents.

• FY 1999 PLAN:

(\$1,798) NAVMACS II/SMS: Continue DMS Tactical Afloat research and development efforts. Provide test and evaluation of DMS components and protocols in SMS/IT-21 network centric environment. Integrate DMS components and protocols with SMTP and other legacy protocols. Conduct intersystem integration and testing for shipboard SMS. Begin FAMIS interface testing of Smart-push/Warrior-pull with P-MUL broadcast. Continue accommodation to C3 technology including migration to WIN NT DII/COE compliant environment.

• FY 2000 PLAN:

(\$1,147) Continue Tactical DMS/SMS afloat migration efforts. Continue accommodation of emergent technology including Navy Virtual Internet (NVI). Conclude FAMIS interface testing of Smart-push/Warrior-pull and P-MUL broadcast. Conduct integration and evaluation of messaging High Assurance Guard (HAG). Conduct fleet developmental testing of SMS.

R-1 Shopping List - Item No 156-3 of 156-16

UNCLASSIFIED

Exhibit R-2a, RDT&E,N Project Justification (X0725)

UNCLASSIFIED

FY 2000 President's Budget Estimates

Exhibit R-2a, RDT&E,N Project Justification

Date: FEB 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204163N

PROGRAM ELEMENT TITLE: FleetCommunications

PROJECT NUMBER: (X0725)

PROJECT TITLE: Communication
Automation

PROGRAM CHANGE SUMMARY: FY 98: Reflects a \$-19K SBIR transfer, a \$-836K BTR reduction, and \$-37K miscellaneous reductions. FY 99-00: Reflects \$-698K reduction due to C4I RDT&E Expenditure Carryover and \$-10K miscellaneous reductions.

B. OTHER PROGRAM FUNDING SUMMARY:

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>To Complete</u>	<u>Total Cost</u>
OPN Line 3050 - Ship Comm Auto - NAVMACS										
5,396	23,698	18,679							CONT	CONT
O&MN 4A6M - NAVMACS										
600	600	1,491							CONT	CONT

C. Acquisition Strategy: N/A

D. Schedule Profile: N/A

R-1 Shopping List - Item No 156-4 of 156-16

UNCLASSIFIED

Exhibit R-2a, RDT&E,N Project Justification (X0725)

UNCLASSIFIED

FY 2000 President's Budget Estimates

Exhibit R-3, RDT&E,N Poject Cost Analysis

Date: FEB 1999

PROGRAM ELEMENT: 0204163N

PROJECT NUMBER: (X0725)

BUDGET ACTIVITY: 7

Exhibit R-3 Cost Analysis (page 1)				Date: February 1999								
APPROPRIATION/BUDGET ACTIVITY 7		PROGRAM ELEMENT Fleet Communications			PROJECT NAME AND NUMBER: X0725 Communications Automation							
		0204163N										
Cost Categories	Contract Method & Type	Performing Activity & Location	Total FY98 & PYs Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date	FY01 Cost	FY01 Award Date	Cost To Complete	Total Cost	Target Value of Contract
240 Engineering Development	WX	SSC, San Diego	708	493	12/98	150	12/99			CONT	CONT	CONT
240 Engineering Development	CPFF	Lockheed Martin	0	0		100	12/99			CONT	CONT	CONT
240 Engineering Development	Various	Various Labs	0	120	12/98	0				CONT	CONT	CONT
240 Engineering Development	WX	SSC Charleston	0	950	12/98	540	12/99			CONT	CONT	CONT
240 Engineering Development	CPFF	SEMCOR	0	145	12/98	125	12/99			CONT	CONT	CONT
Subtotal Product Development			708	1,708		915						
Remarks:												
Subtotal Support												
Remarks												

R-1 Shopping List - Item No 156-5 of 156-16

UNCLASSIFIED

Exhibit R-3, RDT&E,N Project Cost Analysis

UNCLASSIFIED

FY 2000 President's Budget Estimates

Exhibit R-3, RDT&E, N Project Cost Analysis

Date: FEB 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204163N

PROJECT NUMBER: (X0725)

Cost Categories	Contract Method & Type	Performing Activity & Location	FY 98 and Prior	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date	FY01 Cost	FY01 Award Date	Cost To Complete	Total Cost	Target Value of Contract
400 System T&E	Various	Various	0	0	Var	150	Var			CONT	CONT	CONT
Subtotal T&E				0		150						
Remarks												
210 Project Management	WX	SSC, San Diego		90	12/99	82	12/99			CONT	CONT	CONT
Subtotal Management				90		82						
Remarks												
Total Cost			708	1,798		1,147						
Remarks												

R-1 Shopping List - Item No 156-6 of 156-16

UNCLASSIFIED

Exhibit R-3, RDT&E, N Project Cost Analysis

UNCLASSIFIED

FY 2000 President's Budget Estimates

Exhibit R-2a, RDT&E,N Project Justification

Date: FEB 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204163N

PROJECT NUMBER: (X2074)

PROGRAM ELEMENT TITLE:
FleetCommunications

PROJECT TITLE: Communication
Support Systems

Cost (\$ in Thousands)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
X2074 Communication Support Systems	1,505	0	0	0	0	0	0	0	0	0

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION

(U) This project was an initiative to develop the Copernicus architecture and implementation concept, an integrated Navy information system architecture based on shared use of links and multimedia networks. It provides increased communication survivability, throughput and security. The Copernicus system concept further integrates the approach to research, development, acquisition, and deployment of a total Command, Control and Communications Intelligence (C3I) system supporting Navy missions. The work performed was a system engineering effort that generated engineering solutions and guidelines, prototyping and early operational capabilities, and transition plans for incremental fielding involving all current and planned Navy communication systems.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1998 ACCOMPLISHMENTS:

- (U) (\$72K) Built, tested, demonstrated and supported fielding of JMCMS Build 3. (Consisting of various ship and shore versions of the Automated Digital Network System (ADNS)).
- (U) (\$1,433) Built, tested, demonstrated and supported fielding of ADNS Afloat Build 2.0 and Submarine Build 2.0 which is a segment of JMCMS Build 3.

2. (U) FY 1999 PLAN: N/A

3. (U) FY 2000 PLAN: N/A

(U) CHANGE SUMMARY EXPLANATION: FY 1998: Reflects a \$-40K SBIR transfer, BTR reduction -\$1,081K, C41 RDT&E Expenditure Carryover -\$70K, FY98 Update -\$459K and a Pending Reprogramming of +\$1,409K.

R-1 Shopping List - Item No 156-7 of 156-16

UNCLASSIFIED

Exhibit R-2a, RDT&E,N Project Justification (X2074)

UNCLASSIFIED

FY 2000 President's Budget Estimates

Exhibit R-2a, RDT&E,N Project Justification

Date: FEB 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204163N

PROJECT NUMBER: (X2074)

PROGRAM ELEMENT TITLE:

PROJECT TITLE: Communication

FleetCommunications

Support Systems

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

B. (U) OTHER PROGRAM FUNDING SUMMARY: N/A

(U) RELATED RDT&E,N: PE 0205604N (Tactical Data Links)

PE 0303109N (Satellite Communications)

PE 0303140N (Information Systems Security Plan)

C. (U) ACQUISITION STRATEGY: Not applicable.

D. (U) SCHEDULE PROFILE: Not applicable.

R-1 Shopping List - Item No 156-8 of 156-16

UNCLASSIFIED

Exhibit R-2a, RDT&E,N Project Justification (X2074)

UNCLASSIFIED

FY 2000 President's Budget Estimates

Exhibit R-2a, RDT&E,N Project Justification

Date: FEB 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204163N

PROGRAM ELEMENT TITLE: FleetCommunications

PROJECT NUMBER: X1083

PROJECT TITLE: Shore to Ship
Communication System

Cost (\$ in Thousands)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
X1083 Shore to Ship Communications System	11,830	13,592	8,108	7,763	6,898	7,090	7,257	7,427	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

This project develops communications systems elements which provide positive command and control of deployed ballistic missile submarines (SSBNs). This program provides enhancements to the shore-to-ship transmitting systems, shipboard receiver systems, and development of the Submarine Low Frequency (LF)/Very Low Frequency (VLF) Versa Module Eurocard (VME) Receiver (SLVR) System (formerly the Advanced VLF/LF VME Receiver (AVR) System). Continuing evaluation of this communications system is provided via the Strategic Communications Assessment Program (SCAP). Fixed VLF/LF develops an energy efficient, solid state, power amplifier replacement (SSPAR) for the VLF shore based transmitters of the Submarine Broadcast System, investigates improvement of the radio frequency high voltage insulators, bushings and antenna components used in these stations through the High Voltage Insulator Program (HVIP) and measures and signal propagation through the Coverage Prediction Improvement Program (CPIP).

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

FY 1998 ACCOMPLISHMENTS:

- (\$350) Continued High Voltage and antenna component development and test.
- (\$6,257) Completed SLVR OPEVAL, Milestone III, and continue integration and laboratory test of the KG-38 replacement and SLVR P3I.
- (\$1,345) SCSS Phase II integration.
- (\$3,624) Continued SCAP and continuing evaluation (CEP)
- (\$254) Developed and updated Naval Command, Control, Communications, Computers, Intelligence, Sensors and Reconnaissance (C4ISR) implementation guidance.

R-1 Shopping List - Item No 156-9 of 156-16

UNCLASSIFIED

Exhibit R-2a, RDT&E,N Project Justification (X1083)

UNCLASSIFIED

FY 2000 President's Budget Estimates

Exhibit R-2a, RDT&E,N Project Justification

Date: FEB 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204163N

PROGRAM ELEMENT TITLE: FleetCommunications

PROJECT NUMBER: X1083

PROJECT TITLE: Shore to Ship
Communication System

FY 1999 PLAN:

- (\$257) Continue high voltage and antenna component development and test.
- (\$6,074) Develop the ELF, Signal Processing and KOV-17 integration into SLVR.
- (\$898) Complete SCSS Phase II integration.
- (\$3,634) Continue SCAP and conduct continuing evaluations (CEP).
- (\$2,729) Install and test SSPAR Engineering and Manufacture Development Model at NCTAMSLANT Det, La Moure, N.D.

FY 2000 PLAN:

- (\$357) Continue high voltage and antenna component development and test.
- (\$2,922) Continue development of the ELF and Signal Processing integration into SLVR..
- (\$1,858) Begin SCSS 01.0 Phase integration and implementation.
- (\$2,971) Continue SCAP and conduct continuing evaluations (CEP).

R-1 Shopping List - Item No 156-10 of 156-16

UNCLASSIFIED

Exhibit R-2a, RDT&E,N Project Justification (X1083)

UNCLASSIFIED

FY 2000 President's Budget Estimates

Exhibit R-2a, RDT&E,N Project Justification

Date: FEB 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204163N

PROJECT NUMBER: X1083

PROGRAM ELEMENT TITLE: FleetCommunications

PROJECT TITLE: Shore to Ship

Communication System

(U) PROGRAM CHANGE SUMMARY: FY 1998: Reflects a \$-188K SBIR reduction, a\$-355K BTR reduction, and \$-161K miscellaneous reductions and a Pending Reprogramming of +\$400K.. FY 99-00: Reflects a \$+300K increase due to realignment of TACAMO funding to CEP , CAAS reduction -\$97K and \$-60K miscellaneous reductions.

B. (U) OTHER PROGRAM FUNDING SUMMARY

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	To Complete	Total Cost
*OPN Line 3107 Shore LF	7,456	12,975	36,361						CONT	CONT
OPN Line 3147 Advanced VLF Receiver	7,353	17,100	0						CONT	CONT
O&MN 4A6M	21,360	16,202	18,378						CONT	CONT

*This program consolidates OPN P-1 Line Item Advanced VLF Receiver beginning in FY00.

C. (U) ACQUISITION STRATEGY:

FY 1998 FY 1999 FY 2000

Program Milestones	3Q SLVR MS III		
T&E Milestones	1Q SLVR OPEVAL (OT-IIB)	1Q SLVR P3I (OT-III)	

D. (U) SCHEDULE PROFILE: See paragraph C.

R-1 Shopping List - Item No 156-11 of 156-16

UNCLASSIFIED

Exhibit R-2a, RDT&E,N Project Justification (X1083)

UNCLASSIFIED

FY 2000 President's Budget Estimates

Exhibit R-3, RDT&E,N Project Cost Analysis

Date: FEB 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0204163N

PROJECT NUMBER: X1083

Cost Categories	Contract Method & Type	Performing Activity & Location	FY 98 and Prior	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date	FY01 Cost	FY01 Award Date	Cost To Complete	Total Cost	Target Value of Contract
240 Engineering Support	CPIF	Rockwell, Richardson, TX	13,468	2,729	12/93	0	12/93			\$21.1M		\$21.1M
240 Engineering Support	CPFF	APL/JHU Baltimore, MD	16,826	3,634	10/97	2,971	10/99			CONT	CONT	CONT
240 Engineering Support	WR	NCCOSC, San Diego, CA	23,494	5,538	10/95	2,661	10/95			CONT	CONT	N/A
240 Engineering Support	WR	Miscellaneous Labs, NUWC	3,786	898	10/95	1,858	10/95			CONT	CONT	N/A
240 Engineering Support	WR	U.S. Army, Monmouth, NJ	3,172	0	2/96	0	N/A				0	N/A
240 Engineering Support	Various	Various	0	0	N/A	0	N/A				0	
Subtotal Product Development			60,746	12,799		7,490						
Remarks:												
Subtotal Support												
Remarks												

R-1 Shopping List - Item No 156-12 of 156-16

UNCLASSIFIED

Exhibit R-3, RDT&E,N Project Cost Analysis

UNCLASSIFIED

FY 2000 President's Budget Estimates

Exhibit R-3, RDT&E,N Project Cost Analysis

Date: FEB 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0204163N

PROJECT NUMBER: X1083

Cost Categories	Contract Method & Type	Performing Activity & Location	FY 98 and Prior	FY 99 Cost	FY 99 Award Date	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	Cost To Complete	Total Cost	Target Value of Contract
400 System T&E	Various	Various	400	0	N/A	0	N/A					
Subtotal T&E			400	0		0						
Remarks												
210 Program Management	Various	Various	2,241	793	N/A	618	N/A			CONT		
Subtotal Management			2,241	793		618						
Remarks												
Total Cost			63,387	13,592		8,108						
Remarks												

R-1 Shopping List - Item No 156-13 of 156-16

UNCLASSIFIED

Exhibit R-3, RDT&E,N Project Cost Analysis

UNCLASSIFIED

FY 2000 President's Budget Estimates

Exhibit R-2a, RDT&E,N Project Justification

Date: FEB 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204163N

PROGRAM ELEMENT TITLE: FleetCommunications

PROJECT NUMBER: X0795

PROJECT TITLE: MEECN

Cost (\$ in Thousands)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
X0795 MEECN	452	722	692	706	719	733	750	767	CONT	CONT

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION

Support of Minimum Essential Emergency Communications Network (MEECN). MEECN is the Tri-Service transmission system which ensures delivery of Emergency Action Messages (EAMs) to our strategic platforms. Because of substantial downsizing in the number of MEECN assets, such as the CINC Airborne Command Post (ABNCP) fleet, it is necessary to improve the range, timeliness and reliability of MEECN communications to maintain connectivity to the platforms. This project identifies, researches, and develops improvements to the MEECN primarily in the Very Low Frequency and Low Frequency (VLF/LF) ranges of MEECN. The MEECN Message Processing Mode (MMPM), which reduces transmission time while improving message delivery reliability at greater ranges, was developed under this project and is being implemented in the MEECN VLF/LF Systems. The new High Data Rate (HIDAR) mode, which greatly reduces message transmission time while providing the performance of low data rate modes, has been deployed. Potential improvements in mode design and signal processing are continually being investigated for MEECN application.

FY 1998 ACCOMPLISHMENTS:

- (\$212) Completed MITB development.
- (\$146) Continued Turbo Code application to MEECN Modes.
- (\$50) Continued atmospheric noise data collection and analysis.
- (\$20) Supported SLVR and MMRT MMPM and HIDAR certification testing in the MITB.
- (\$15) Continued crypto replacement coordination.
- (\$9) Developed and updated Naval Command, Control, Communications, Computers, Intelligence, Sensors and Reconnaissance (C4ISR) implementation guidance.

R-1 Shopping List - Item No 156-14 of 156-16

UNCLASSIFIED

Exhibit R-2a, RDT&E,N Project Justification (X0795)

UNCLASSIFIED

FY 2000 President's Budget Estimates

Exhibit R-2a, RDT&E,N Project Justification Date: FEB 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204163N

PROJECT NUMBER: X0795

PROGRAM ELEMENT TITLE: FleetCommunications

PROJECT TITLE: MEECN

FY 1999 PLAN:

- (\$291) Continue Turbo Code application to MEECN Modes.
- (\$215) Initiate development of improved MEECN Mode.
- (\$161) Initiate study to integrate NONAP and Signal Separator AJ algorithms.
- (\$40) Investigate HIDAR/Block II compatibility.
- (\$15) Continue crypto replacement coordination.

FY 2000 PLAN:

- (\$306) Complete Turbo Code application to MEECN Modes.
- (\$204) Continue development of improved MEECN Mode.
- (\$167) Continue study to integrate NONAP and Signal Separator AJ algorithms.
- (\$15) Continue crypto replacement coordination.

(U) PROGRAM CHANGE SUMMARY: FY 98: Reflects a \$-12K SBIR reduction, a \$-6K BTR reduction, and \$-11K miscellaneous reductions. FY 99-00: Reflects \$-7K miscellaneous reductions.

R-1 Shopping List - Item No 156-15 of 156-16

UNCLASSIFIED

Exhibit R-2a, RDT&E,N Project Justification (X0795)

UNCLASSIFIED

FY 2000 President's Budget Estimates

Exhibit R-2a, RDT&E,N Project Justification

Date: FEB 1999

PROJECT NUMBER: X0795
PROJECT TITLE: MEECN

PROGRAM ELEMENT: 0204163N
PROGRAM ELEMENT TITLE: FleetCommunications

BUDGET ACTIVITY: 7

B. (U) OTHER PROGRAM FUNDING SUMMARY

	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Complete CONT	Total Cost CONT
O&MN 4A6M	312	352	715							

C. (U) ACQUISITION STRATEGY: Not applicable.

D. (U) SCHEDULE PROFILE: Not applicable.

R-1 Shopping List - Item No 156-16 of 156-16

UNCLASSIFIED

Exhibit R-2a, RDT&E,N Project Justification (X0795)

UNCLASSIFIED

EXHIBIT R-2, FY 2000 RDT&E, N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204229N

PROGRAM ELEMENT TITLE: TOMAHAWK AND THEATER MISSION PLANNING CENTER

COST: (Dollars in Thousands)

<u>Project Number & Title</u>	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>To</u>	<u>Total</u>
<u>Budget</u>	<u>Budget</u>	<u>Budget</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Complete</u>	<u>Program</u>
A0545	\$98,776	\$163,123*	\$145,317	\$107,895	\$51,598	\$33,243	\$10,833	\$11,164	Continuing	Continuing
Tomahawk										
A1784	\$2,903	\$2,562	\$1,906	\$1,891	\$22	\$28	\$28	\$28	0	\$96,816
Theater Mission Planning Center										
TOTAL	\$101,679	\$165,685	\$147,223	\$109,786	\$51,620	\$33,271	\$10,861	\$11,192	Continuing	Continuing

Quantity of RDT&E Articles

6 EDM
6 EDM

*FY99 budget reflects Congressional Realignment of \$98.573M for the Tactical Tomahawk Program (A2658) and \$1M Congressional Add for Alternate Turbine Engine (A2659).

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

(U) The TOMAHAWK Weapons System (TWS) provides the Tomahawk cruise missile attack capability against targets on land (Tomahawk Land Attack Missile (TLAM)). The TLAM can be fitted with either Conventional unitary warhead (TLAM/C), Nuclear warhead (TLAM/N) or submunition Dispenser (TLAM/D). This program ensures that the TWS exploits state-of-the-art technology to preserve the efficiency of this proven weapon system.

(U) The Tomahawk project includes all missile development; mission planning system development, and submarine and surface ship weapons control development.

(U) The Tomahawk TLAM Block III system upgrade (IOC March 93) incorporated the Global Positioning System (GPS) capability; provided a smaller, lighter warhead with variable fuze, extended range, Time of Arrival, and improved accuracy for low contrast matching of Digital Scene Matching Area Correlator. The Tactical Tomahawk (TT) Weapons program, beginning in FY 1998, will provide the tactical commander a quick reaction response capability as well as improved flexibility, accuracy, and lethality.

(U) The Theater Mission Planning Center (TMPC) project provides for the TMPC and the Afloat Planning System (APS), a shipboard version of TMPC. TMPC and APS provide mission planning and employment support information for both the nuclear (TMPC only) and conventional TLAM. The TMPC/APS software development decreases mission planning time and increases the quality and accuracy of each mission. TMPC provides mission planning at the theater level and is designed for high rate production responsive to national/strategic requirements. APS provides mission planning at the Battle Group level that is responsive to the needs of the tactical situation. Tomahawk Strike Planning Tools are comprised of two elements. The Mission Distribution System (MDS) is a subset of TMPC, and APS also deployed as the stand-alone TLAM employment system, that support the effective employment of TLAM by the Force Level Tomahawk Strike Coordinator (TSC). The Electronic Tomahawk Employment Planning Package (ETEPP) provides the Tomahawk user with command and control information needed to employ Tomahawk missions.

(U) These efforts provide battle-group tactical flexibility and responsiveness while maximizing TWS wartime capability.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it encompasses engineering and manufacturing development for upgrade of existing operational systems.

**R-1 Item No. 157
UNCLASSIFIED**

UNCLASSIFIED

EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204229N

PROJECT NUMBER: A0545

PROGRAM ELEMENT TITLE: TOMAHAWK AND THEATER MISSION
PLANNING CENTER

PROJECT TITLE: TOMAHAWK

COST: (Dollars in Thousands)

Project Number & Title	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete Continuing	Total Program Continuing
A0545	\$98,776	\$163,123*	\$145,317	\$107,895	\$51,598	\$33,243	\$10,833	\$11,164		
TOTAL	\$98,776	\$163,123*	\$145,317	\$107,895	\$51,598	\$33,243	\$10,833	\$11,164	Continuing	Continuing

Quantity of RDT&E Articles

6	6
EDM	EDM

*FY99 budget reflects Congressional Realignment of \$98.573M for the Tactical Tomahawk Program (A2658) and \$1M Congressional Add for Alternate Turbine Engine (A2659).

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

(U) The TOMAHAWK Cruise Missile has been designed to accurately attack land targets from seaborne platforms at great distances from the launch platform (Tomahawk Land-Attack Missile (TLAM)). The TLAM can be produced with either a single conventional warhead (TLAM/C), a submunition dispenser (TLAM/D), or a nuclear warhead (TLAM/N).

(U) The Tomahawk development program (Project A0545), beginning with FY 1998, contains all costs for the Tactical Tomahawk (TT) program including the missile, weapons control systems, both surface ship and submarine, and the Tomahawk command and control systems (TC2S).

(U) The last fielded upgrade to the Tomahawk system was designated Block III. This effort added a GPS capability, a smaller, lighter warhead, a time of arrival calculation, added range, and an updated Digital Scene Matching Area Correlator for low contrast matching. The missile development covered by this budget, Tactical Tomahawk provides a comprehensive baseline upgrade to the Tomahawk Weapon System including the missile, weapons control systems, and mission planning systems. The upgrade will improve system flexibility, responsiveness, accuracy and lethality. The essential elements of the TT are upgrades to the guidance, navigation, control, and mission computer systems of the missile along with the associated Command and Control (C2) systems and weapons control systems. TT will provide a UHF Satcom data link to enable the missile to receive in-flight mission modification messages, to transfer health and status messages, and to broadcast Battle Damage Assessment/Battle Damage Indication (BDA/BDI) messages. TT also includes the development of a high anti-jam GPS receiver and antenna system for the missile.

(U) The weapons control development portion of the project is centered on the Advanced Tomahawk Weapons Control System (ATWCS), being introduced into the surface and submarine fleets. The ATWCS advancements are increase data throughput thereby reducing the time needed to execute missile preparation and launch sequences, and improving strike coordination capabilities.

R-1 Item No. 157

UNCLASSIFIED

UNCLASSIFIED

EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0204229N**

PROJECT NUMBER: A0545
PROJECT TITLE: TOMAHAWK

**PROGRAM ELEMENT TITLE: TOMAHAWK AND THEATER MISSION
PLANNING CENTER**

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1998 ACCOMPLISHMENTS:

- [\$4,129]** Continued development of Sub-ATWCS for Combat Control System MK2 Program Block 1C.
Delivered engagement planning Interface Definition Language prototype and engineering build software of Sub-ATWCS for Block 1C.
- [\$94,647]** April, 1998, permission from Navy, OSD, and Congress received to transition from Tomahawk Baseline Improvement Program (TBIP) to Tactical Tomahawk Program. Continued all C2 development through Critical Design Review (CDR) and began coding software.

2. FY 1999 PLAN:

- [\$4,200]** Develop and deliver software for SSN 688 MK2 Block 1C Mod 0/1 and Mod 2.
- [\$155,531]** Continue TT Engineering and Manufacturing Development including mission planning and weapons control development.
- [\$3,392]** Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. FY 2000 PLAN:

- [107,214]** Continue development of Tactical Tomahawk missile leading to System CDR
- [38,103]** Continue missile prototype fabrication and ground testing to begin Development Testing (DT-1, 2) in 2001.
- Continue development of common launch and track control systems for surface ship and submarine platforms for the new Tactical Tomahawk baseline. Critical Design Review leading to Development Testing of entire system in 2001.

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204229N

PROJECT NUMBER: A0545

**PROGRAM ELEMENT TITLE: TOMAHAWK AND THEATER MISSION
PLANNING CENTER**

PROJECT TITLE: TOMAHAWK

(U) B. PROGRAM CHANGE SUMMARY

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
(U) FY 1999 President's Budget:	\$85,768	\$64,159	\$36,514
(U) Appropriated Value:	\$88,417	\$163,732	
(U) Adjustments from President's Budget:	\$13,008	\$98,964	\$108,803
(U) FY2000 President's Budget Submit:	\$98,776	\$163,123	\$145,317

CHANGE SUMMARY EXPLANATION:

(U) Funding: FY98 net increase of +\$13,008 thousand consists of an increase of +\$19,600 thousand for Above Threshold Reprogramming for Tactical Tomahawk; and decreases of -\$1,857 thousand for Small Business Innovative Research reduction, -\$4,424 thousand for the Navy's reprioritization of requirements and -\$311 thousand for canceled account adjustments. FY99 net increase of +\$98,964 thousand consists of increases of +\$98,573 thousand for Tactical Tomahawk Congressional Realignment, +\$1,000 thousand for Alternate Turbine Engine Congressional Add; and decreases of -\$ 377 for inflation adjustments, -\$133 thousand for undistributed Congressional reductions, and -\$99 thousand for minor programmatic adjustments. FY00 net increase of +\$109,090 thousand consists of +\$110,895 thousand from prior Congressional realignment action for Tactical Tomahawk and +\$13 thousand for miscellaneous rate adjustments; and decreases of -\$2,105 thousand for inflation adjustments.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

PROJECT NUMBER: A0545
PROJECT TITLE: TOMAHAWK

PROGRAM ELEMENT: 0204229N
PROGRAM ELEMENT TITLE: TOMAHAWK AND THEATER MISSION
PLANNING CENTER

BUDGET ACTIVITY: 7

(U) C. OTHER PROGRAM FUNDING SUMMARY (Dollars in Thousands)

	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To	Total
Appn	Budget	Budget	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Complete	Program
WPN	\$26,305	\$33,001	\$50,894	\$59,556	\$92,153	\$141,480	\$195,177	\$294,510	Continuing	Continuing
OPN	\$63,093	\$101,548	\$87,857	\$74,701	\$72,360	\$63,367	\$65,339	\$67,100	Continuing	Continuing

Related RDT&E

Not applicable.

(U) D. ACQUISITION STRATEGY:

In 1998 the Tomahawk Baseline Improvement Program (TBIP) transitioned to the Tactical Tomahawk program. This program is outlined in the Class Justification and approval (CJ&A No AIR-22448) signed by the Under Secretary of the Navy on 29 May 1998. The acquisition strategy, in brief, is to transition the on-going Tomahawk Baseline Improvement Program (TBIP) to Tactical Tomahawk (TT). The Tactical Tomahawk development program will be a cost sharing arrangement between the Government and the Contractor to add capability to the missile. The resulting production contract incentivizes a significant reduction in price for the manufactured items. In order to be cost effective the price of the manufactured items must be significantly lower than the cost of remanufacturing a Block II or Block III missiles.

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204229N

PROGRAM ELEMENT TITLE: TOMAHAWK AND THEATER MISSION
PLANNING CENTER

PROJECT NUMBER: A0545

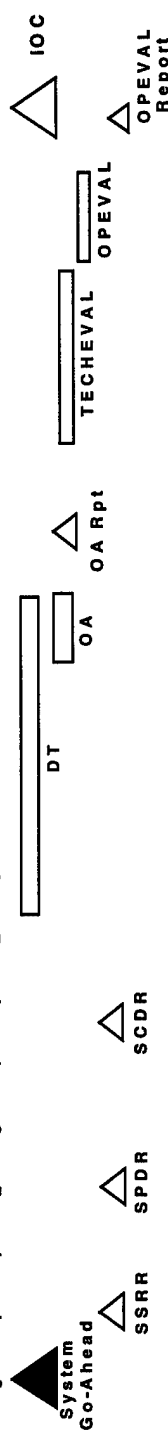
PROJECT TITLE: TOMAHAWK

E. Schedule Profile

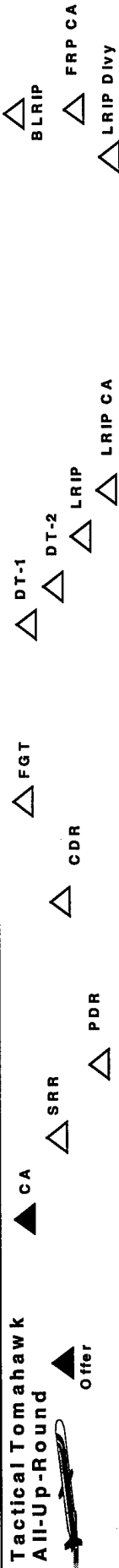
TACTICAL TOMAHAWK PROGRAM MASTER SCHEDULE



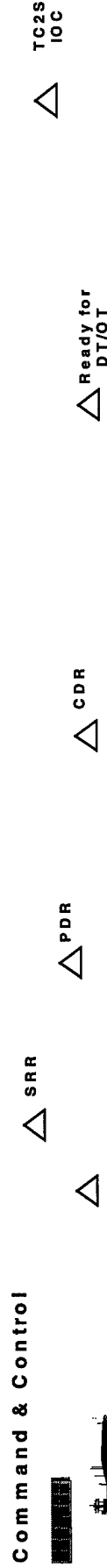
TWS SYSTEM EVENTS



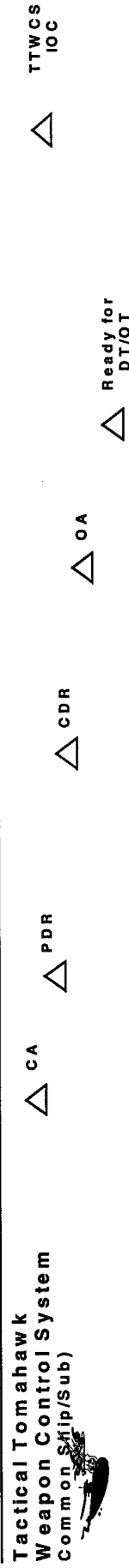
Tactical Tomahawk All-Up-Round



Command & Control



Tactical Tomahawk Weapon Control System Common Ship/Sub



6/16/98

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204229N

**PROGRAM ELEMENT TITLE: TOMAHAWK AND THEATER MISSION
PLANNING CENTER**

**PROJECT NUMBER: A0545
PROJECT TITLE: TOMAHAWK**

Definitions

SSRR - System Software Requirements Review
SPDR - System Preliminary Design Review
SCDR- System Critical Design Review
DT- Development Test
OT - Operational Test
IOC - Initial Operational Capability
CA - Contract Award
FRP CA - Full Rate Production Contract Award
LRIP - Low Rate Initial Production

SRR - Software Requirements Review
PDR - Preliminary Design Review
CDR- Critical Design Review
OA - Operational Assessment
CCS ECP - Submarine Combat and Control System Engineering Change Proposal
LBSIT - Land-Based System Integration Test
SBSIT - Ship-based System Integration Test
SDCT - System Design Connectivity Test
TRR - Test Readiness Review

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EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204229N

PROJECT NUMBER: A0545

PROGRAM ELEMENT TITLE: TOMAHAWK AND THEATER MISSION

PROJECT TITLE: TOMAHAWK

PLANNING CENTER

<u>Cost Categories:</u>	<u>Contract Method & Type</u>	<u>Performing Activity & Location</u>	<u>Total Prior Yrs Cost</u>	<u>FY 1999</u>		<u>FY 2000</u>		<u>Total Cost</u>	<u>Target Value of Contract</u>
				<u>Cost</u>	<u>Date</u>	<u>Cost</u>	<u>Date</u>		

Primary Hardware Development

All Product Development Costs, 1974- through TBIP Costs in FY 98

Primary Hardware Development, Tactical

Tomahawk Program

\$2,176,447

AUR CPFF Raytheon, Tucson, AZ \$31,510 \$88,340 11/98 \$53,400 11/99 \$19,220 \$172,470

Launcher Integration

TBD Lockheed, Bethesda, MD \$0 \$15,000 11/98 \$15,000 11/99

Systems Engineering

FP Raytheon, Tucson, AZ \$2,000 \$2,000 10/98 Continuing

UARC APL, Laurel, MD \$3,700 \$3,800 1/99 Continuing

FP Boeing, St Louis, MO \$3,000 \$0 Continuing

Subtotal Project Development

\$2,216,657 \$88,840 \$74,200

Remarks: None.

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EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204229N

PROJECT NUMBER: A0545
PROJECT TITLE: TOMAHAWK

**PROGRAM ELEMENT TITLE: TOMAHAWK AND THEATER MISSION
PLANNING CENTER**

<u>Cost Categories:</u>	<u>Contract Method & Type</u>	<u>Performing Activity & Location</u>	<u>Total Prior Yrs Cost</u>	<u>FY 1999 Award</u>		<u>FY 2000 Award</u>		<u>Cost to Complete</u>	<u>Total Cost</u>	<u>Target Value of Contract</u>
				<u>Cost</u>	<u>Date</u>	<u>Cost</u>	<u>Date</u>			
Development Support	Economy Act	NSWC,Dahlgren,VA	\$5,021	\$814	11/98	\$890	11/99	Continuing	Continuing	Continuing
	Economy Act	NAWC-WD,China Lk,CA	\$2,999	\$2,000	11/98	\$2,444	11/99	Continuing	Continuing	Continuing
	Economy Act	NSWC,Pt Hueneme, CA	\$0	\$200	11/98	\$400	11/99	Continuing	Continuing	Continuing
	Economy Act	NAWC-AD, Pax River, MD	\$0	\$400	11/98	\$400	11/99	Continuing	Continuing	Continuing
	Economy Act	NWAD, Corona,CA	\$0	\$200	11/98	\$200	11/99	Continuing	Continuing	Continuing
	Economy Act	NUWC, Newport, RI	\$0	\$400	11/98	\$600	11/99	Continuing	Continuing	Continuing
	SS/CPFF	SAIC, Arlington, VA	\$287	\$1,100	12/98	\$1,100	12/99	Continuing	Continuing	Continuing
	Economy Act	NOS, Indian Head, MD	\$0	\$510	11/98	\$600	11/99	Continuing	Continuing	Continuing
	Economy Act	NAVSEA (PMS-400), VA	\$200	\$200	11/98	\$0	11/99	Continuing	Continuing	Continuing
	Economy Act	SPAWAR (PMW-171), CA	\$725	\$800	11/98	\$0	11/99	Continuing	Continuing	Continuing
	CPFF	Boeing, St Louis, MO	\$900	\$0		\$0				
	CPFF	LMVF, Valley Forge, PA	\$1,100	\$0		\$0				
	Economy Act	NAVSEA (PMS-425), VA	\$200	\$0		\$0				
	Economy Act	NAVSEA (PMS-410), VA	\$1,300	\$0		\$0				
	CPFF	Raytheon TI, San Jose, CA	\$2,617	\$0		\$0				
	UARC	APL, MD	\$870	\$1,600	1/99	\$1,400	1/00	Continuing	Continuing	Continuing
Software Development	Economy Act	NSWC, Dahlgren, VA	\$4,443	\$6,700	11/98	\$7,600	11/99	Continuing	Continuing	Continuing
	Economy Act	NSWC, Pt Hueneme, CA	\$150	\$1,500	11/98	\$1,500	11/99	Continuing	Continuing	Continuing
	Economy Act	NUWC, Newport, RI	\$4,749	\$1,264	11/98	\$813	11/99	Continuing	Continuing	Continuing
	SS/CPFF	Raytheon, Arlington, VA	\$5,100	\$0		\$0		Continuing	Continuing	Continuing
	Comp	TBD	\$300	\$35,800	10/98	\$26,700	10/99	Continuing	Continuing	Continuing
	CPFF	LMVF, Valley Forge, PA	\$5,636	\$0		\$0		Continuing	Continuing	Continuing
	Subtotal Support		\$36,597	\$53,488		\$44,647				

Remarks: Software development includes costs of the entire Tomahawk development program including the missile, weapons control systems, and command and control systems.

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EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204229N

PROJECT NUMBER: A0545
PROJECT TITLE: TOMAHAWK

**PROGRAM ELEMENT TITLE: TOMAHAWK AND THEATER MISSION
PLANNING CENTER**

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999		FY 2000		Cost to Complete	Total Cost	Target Value of Contract
				Cost	Award Date	Cost	Award Date			
Developmental, Test & Evaluation	SS/CPFF	Raytheon,Tucson,AZ	\$0	\$0		\$12,805	10/99	Continuing	Continuing	
	Economy Act	COMOPTTEVFOR,VA	\$400	\$400	11/98	\$400	11/99	Continuing	Continuing	
	Economy Act	NAWC,Pt Mugu Tst Spt (CT),CA	\$660	\$1,645	11/98	\$4,421	11/99	Continuing	Continuing	
	Economy Act	NAWC,China Lk Fit Tst Spt (CT), CA	\$1,320	\$1,258	11/98	\$8,844	11/99	Continuing	Continuing	
Subtotal Test & Evaluation			\$2,380	\$3,303		\$26,470				

Remarks: All testing through FY 2001 are Development Testing leading to an Operational Assessment (OA). See schedule.

Contractor Engineering Support
Special TBIP Termination Costs

Negotiated Raytheon,Tucson,AZ

\$0 \$14,100 2/99

\$0

Subtotal Management
SBIR Assessment

\$0 \$14,100 \$3,392

\$0

Remarks: None.

Total Cost	\$2,255,634	\$163,123	\$145,317	Continuing	Continuing
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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0204229N**

PROJECT NUMBER: A1784

**PROGRAM ELEMENT TITLE: TOMAHAWK AND THEATER MISSION PROJECT TITLE: THEATER MISSION PLANNING
PLANNING CENTER CENTER**

(U) COST: (Dollars in Thousands)

<u>Project Number & Title</u>	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>To</u>	<u>Total</u>
A1784 Theater Mission	<u>Budget</u> \$2,903	<u>Budget</u> \$2,562	<u>Estimate</u> \$1,906	<u>Estimate</u> \$1,891	<u>Estimate</u> \$22	<u>Estimate</u> \$28	<u>Estimate</u> \$28	<u>Estimate</u> \$28	<u>Complete</u> \$0	<u>Program</u> \$96,816
Planning Center										
TOTAL	\$2,903	\$2,562	\$1,906	\$1,891	\$22	\$28	\$28	\$28	\$0	\$96,816

Quantity of RDT&E Articles

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

The TOMAHAWK Theater Mission Planning Center (TMPC) ashore and Afloat Planning System (APS) provide data base generation and processing, flight mission data, command and control information preparation, and distribution for nuclear (TMPC only) and conventional TOMAHAWK Land Attack Missiles. The TMPC project designs and develops software to decrease mission planning time in response to contingency requirements, improves the production of missile data for distribution and provides automated command and control information for employment and strike planning. APS utilizes the TMPC software on down-sized and ruggedized computer hardware for use in support of Afloat Strike Warfare Commanders. This improves battle-group tactical flexibility and responsiveness while maximizing TOMAHAWK Weapon Systems (TWS) warfare capability. The TMPC and APS systems will be compatible with the Navy Command and Control Systems and the TOMAHAWK Weapon System. TOMAHAWK Strike Planning Tools are comprised of two elements. The Mission Distribution System (MDS) allows TOMAHAWK users the capability to transmit and receive mission data updates in a tactical environment. The Electronic TOMAHAWK Employment Planning Package (ETEPP) provides the TOMAHAWK user with command and control information needed to employ TOMAHAWK missions.

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204229N

PROJECT NUMBER: A1784

**PROGRAM ELEMENT TITLE: TOMAHAWK AND THEATER MISSION PROJECT TITLE: THEATER MISSION PLANNING
PLANNING CENTER CENTER**

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1998 ACCOMPLISHMENTS:

- [\$1,698] Updated TMPC for integration of New National Sensors and Software Architectural Enhancements. Continued to explore and develop software changes to maintain parity with the commercial off the shelf world, to develop increases in throughput and processing efficiency, and to develop adaptations to interface changes mandated by other systems such as imagery systems.**
- [\$1,205] Supported development of enhancements to the MDS and ETEPP portion of the Tomahawk Strike Planning.**

2. FY 1999 PLAN:

- [\$1,465] Continue TMPC integration of New National Sensors and Software Architectural Enhancements.**
- [\$1,034] Support development of enhancements to the MDS and ETEPP portion of the Tomahawk Strike Planning Tools.**
- [\$63] Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.**

3. FY 2000 PLAN:

- [\$1,906] Continue TMPC integration of New National Sensors and Software Architectural Enhancements.**

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DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204229N

PROJECT NUMBER: A1784

PROGRAM ELEMENT TITLE: TOMAHAWK AND THEATER MISSION PROJECT TITLE: THEATER MISSION PLANNING
PLANNING CENTER CENTER

(U) B. PROGRAM CHANGE SUMMARY

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
(U) FY 1999 President's Budget:	\$2,992	\$2,568	\$1,934
(U) Appropriated Value:	\$3,083	\$2,568	
(U) Adjustments from Pres Budget:	(\$89)	(\$6)	(\$28)
(U) FY 2000 President's Budget Submit:	\$2,903	\$2,562	\$1,906

CHANGE SUMMARY EXPLANATION:

(U) Funding: FY98 net decrease of -\$89 thousand is made up of -\$55 thousand for Small Business Innovative Research reductions, and -\$34 thousand for the Navy's reprioritization of requirements. FY99 and FY00 decreases of -\$6 thousand and \$28 thousand respectively are for inflation adjustments.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

(U) C. OTHER PROGRAM FUNDING SUMMARY (Dollars in Thousands)

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	To	Total
Appn	Budget	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Complete	Program
WPN	\$2,752	\$3,500	\$0	\$0	\$6,325	\$8,000	\$8,200	\$8,300	Continuing	Continuing
OPN	\$30,659	\$58,004	\$37,992	\$27,249	\$27,578	\$28,190	\$28,823	\$29,298	Continuing	Continuing

Related RDT&E

Not applicable.

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204229N

PROJECT NUMBER: A1784

PROGRAM ELEMENT TITLE: TOMAHAWK AND THEATER MISSION PROJECT TITLE: THEATER MISSION PLANNING CENTER

(U) D. ACQUISITION STRATEGY:

The acquisition strategy for this project is maintain contractual continuity to develop system updates to continue TMPC integration of New National Sensors and Software Architectural Enhancements.

(U) E. Program Milestones

Program Milestones

FY 1998	FY 1999	FY 2000
3Q-4Q	3Q-4Q	Annual Fleet
Release to Fleet	Release to Fleet	Release
TMPC 3.1	TMPC 4.0	
None	None	None
TMPC	TMPC	TMPC
APS	APS	APS

Engineering Milestones Contract Milestones

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EXHIBIT R-3, FY 2000RDT&E,N COST ANALYSIS

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204229N

PROJECT NUMBER: A1784

PROGRAM ELEMENT TITLE: TOMAHAWK AND THEATER MISSION PROJECT TITLE: THEATER MISSION PLANNING CENTER

<u>Cost Categories:</u>	<u>Contract Method & Type</u>	<u>Performing Activity & Location</u>	<u>Total Prior Yrs Cost</u>	<u>FY 1999</u>		<u>FY 2000</u>		<u>Total Cost</u>	<u>Target Value of Contract</u>
				<u>Cost</u>	<u>Date</u>	<u>Award</u>	<u>Date</u>		

Primary Hardware Development

Comp/FP	Boeing, St Louis, MO	\$36,841							
SS/CPFF	GD/E, San Diego, CA	\$11,342							
Economy Act	NCCOSC, San Diego, CA	\$4,325							
	Misc. Items 1974-1997	\$34,940							
CPFF	Lockheed, Bethesda, MD	\$100			11/98		11/99		Continuing
CPFF	MTL, Classified	\$360			11/98		11/99		Continuing
Economy Act	NSWC, Dahlgren, VA	\$1,253							Continuing

Subtotal Project Development

\$89,161 \$1,100 \$827

Remarks: None.

Development Support

CPFF	SAIC, Arlington, VA	\$646			11/98		11/99		Continuing
UARC	APL, Laurel, MD	\$544			1/99		1/00		Continuing

Subtotal Support

\$1,190 \$1,462 \$1,079

Remarks: None.

Developmental Test & Evaluation

Subtotal Test & Evaluation

Remarks: None.

\$0 \$0 \$0

Subtotal Management

\$0

\$0

\$0

SBIR Assessment

\$63

Remarks: None.

Total Cost

\$90,351 \$2,562 \$1,906

Continuing Continuing

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EXHIBIT R-2a, FY2000 RDT&E BUDGET PROJECT JUSTIFICATION SHEET DATE: FEB 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0204311N PROJECT NUMBER: X0766
 PROGRAM ELEMENT TITLE: Integrated Surveillance System PROJECT TITLE: IUSS

(U) COST: (Dollars in Thousands)											
PROJECT											
NUMBER & TITLE	FY 1998 ACTUAL	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM	
X0766											
IUSS Detect/											
Classif Syst.	8,025	15,483	11,997	12,014	22,041	21,344	18,845	13,828	CONT.	CONT.	
X0758											
SURTASS	1,231	3,889	6,028	6,400	5,788	6,881	7,781	7,947	CONT.	CONT.	
TOTAL	9,256	19,372	18,025	18,414	27,829	28,225	26,626	21,775	CONT.	CONT.	

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This Program Element (P.E.) comprises two projects - X0766 and X0758. Project X0766 provides for Integrated Undersea Surveillance Systems (IUSS) Research and Development Projects. Project X0758 is for the Surveillance Towed Array Sensor (SURTASS) development efforts. IUSS provides the Navy with its primary means of submarine detection both nuclear and diesel. The program has undergone a major transition from emphasis on maintaining a large dispersed surveillance force keyed to detection and tracking of soviet submarines to a much smaller force that is effective against modern diesel and nuclear submarines in regional/littoral or broad ocean areas of interest. This transition preserves the ability to continue open ocean surveillance.

(U) The IUSS Research and Development project (X0766) funds Fixed Surveillance Systems (FSS) which encompasses the Sound Surveillance System (SOSUS), the Surveillance Direction System (SDS), the Fixed Distributed System (FDS) and SURTASS Low Frequency Active (LFA) developments. The number of SOSUS processing sites has been reduced and the display equipment used at the remaining sites will be converted to SDS/SSIPS (Shore Signal and Information Processing Segment) to significantly lower life cycle costs and enable system-wide consolidation. SURTASS LFA will provide an active adjunct capability for IUSS passive and tactical sensors to assist in countering the quieter diesel and nuclear threats of the 1990s and beyond. The LFA tasks are directed at detection of slow quiet threats in harsh littoral waters.

(U) In order to continue with reductions in life cycle costs and continue with system-wide consolidation, a long-

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EXHIBIT R-2a, FY2000 RDT&E BUDGET PROJECT JUSTIFICATION SHEET DATE: FEB 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0204311N PROJECT NUMBER: X0766

PROGRAM ELEMENT TITLE: Integrated Surveillance System PROJECT TITLE: IUSS

term goal is to develop a single IUSS processor. The IUSS processor will have the capability to process and display data from future underwater systems (such as the Advanced Deployable System (ADS) and FDS-C). The IUSS processor will also have the capability to replace the legacy systems (SSIPS, SDS, and SURTASS) as they reach end of life and require upgrading.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: Budget Activity 7: This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it encompasses engineering and manufacturing development for upgrade of existing operational systems.

B. (U) PROGRAM CHANGE SUMMARY:

- Project X0766 Funding: FY98 decreased by \$171K for FY98 SBIR tax reduction. FY99-00 decreased 1.5% for non pay inflation
- Project X0766 Schedule/Technical: FY98, delay in completing C4ISR analysis; FY99, delay start of CLFA development.
- Project X0758 Funding: FY98 decreased by \$17K for FY98 SBIR tax reduction. FY00 increased \$1200K for common processor.
- Project X0758 Schedule/Technical: N/A

C. (U) OTHER PROGRAM FUNDING SUMMARY:

X0766:	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	TO	TOTAL
	ACTUAL	ESTIMATE	ESTIMATE	ESTIMATE	ESTIMATE	ESTIMATE	ESTIMATE	ESTIMATE	COMPLETE	PROGRAM
OPN# 2225	2,328	0	0	0	0	0	0	28,046	CONT.	CONT.
OMN 1C3C	27,191	29,010	28,748	30,327	30,160	31,498	33,505	40,406	CONT.	CONT.
OPN# 2237	4,571	12,659	7,267	5,594	17,456	9,464	19,721	24,656	CONT.	CONT.

X0766 RELATED RDT&E:

(U) PE 0204311N(Integrated Surveillance System)

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EXHIBIT R-2a, FY2000 RDT&E BUDGET PROJECT JUSTIFICATION SHEET DATE: FEB 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204311N

PROJECT NUMBER: X0766

PROGRAM ELEMENT TITLE: Integrated Surveillance System

PROJECT TITLE: IUSS

- (U) PE 0603785N(Combat Systems Oceanographic Performance Assessment)
- (U) PE 0603747N(Undersea Warfare Advanced Technology)

X0758:	FY1998 ACTUAL	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
OPN #2237	4,571	12,659	7,267	5,594	17,456	9,464	19,721	24,656	CONT.	CONT.

X0758 RELATED RDT&E:

- (U) PE 0204311N(Integrated Surveillance System)
- (U) PE 0603785N(Combat Systems Oceanographic Performance Assessment)
- (U) PE 0603747N(Undersea Warfare Advanced Technology)

D. (U) ACQUISITION STRATEGY: See individual projects for acquisition strategy.

E. (U) SCHEDULE PROFILE: See individual projects for schedule profiles.

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EXHIBIT R-2a, FY2000 RDT&E BUDGET PROJECT JUSTIFICATION SHEET

DATE: FEB 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204311N

PROJECT NUMBER: X0766

PROGRAM ELEMENT TITLE: Integrated Surveillance System

PROJECT TITLE: IUSS

(U) COST (Dollars in thousands)

PROJECT

NUMBER & TITLE	FY 1998 ACTUAL	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X0766 IUSS										
Detect/Classif System										
TOTAL	8,025	15,483	11,997	12,014	22,041	21,344	18,845	13,828	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: LFA will provide an active adjunct capability for IUSS passive and tactical sensors to counter the quieter diesel and nuclear threats of the 1990s and beyond. The LFA tasks are directed at detection of slow quiet threats in harsh littoral waters. Functional improvements are delivered to the Fleet in software "Builds". SURTASS/LFA Build #1 (FY 97) included waveform-processing improvements, tactical processing interfaces, and signal processing enhancements. Build #2 (FY 98) includes Twin-Line/LFA integration; advanced waveforms for littoral/shallow water operations including doppler sensitive waveforms; and processing algorithms to reduce clutter and reverberation false alarms in shallow water. Also includes Adaptive Beamforming; Integration of tactical decision aids for LFA monostatic and bistatic operation; integration of SURTASS active and passive information processing systems to provide contact association and geographic tracking; and common antisubmarine warfare (ASW) OMI and environmental processing. The LFA task includes development and test of a compact LFA transmit source array for SWATH-P ships.

B. (U) PD18 is involved with the development and maintenance of various IUSS systems. These systems include FDS, FDS-C, SDS, SURTASS, and ADS. The near term objective is to obtain a common Operator Machine Interface (OMI) among currently fielded systems. The long-term goal is to develop a single IUSS processor baseline, with minor maintenance efforts continuing on fielded systems. The existing system architecture, signal processing, contact management, and reporting requirements will be evaluated as well as the requirements for future systems. The development of the IUSS processor will take advantage of automation advancement, array technology improvements, and submarine and surface system commonality.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

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EXHIBIT R-2a, FY2000 RDT&E BUDGET PROJECT JUSTIFICATION SHEET

DATE: FEB 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204311N

PROJECT NUMBER: X0766

PROGRAM ELEMENT TITLE: Integrated Surveillance System

PROJECT TITLE: IUSS

1. (U) FY 1998 ACCOMPLISHMENTS:

- (U) (\$ 1,886) Transitioned SDS communications to incorporate use of Fleet standard communications equipment using NAVMACs and JMCIS. Incorporated Fleet required performance enhancements.
- (U) (\$ 1,100) Investigated and corrected Year 2000 data roll over problems within SSIPS/SDS and SURTASS.
- (U) (\$ 1,100) Conducted trade-off studies and analysis for CLFA source array and processing, designs and ship modification and handling system designs.
- (U) (\$ 2,405) Conducted investigations and analysis to support preparation of Environmental Impact Statement (EIS) for SURTASS. Conducted three Scientific Research Program (SRP) at-sea tests to determine impact of LFA sonar on Marine Mammals.
- (U) (\$ 1,534) Initiated update of IUSS to comply with revised Naval Command, Control, Communications, Computer, Intelligence, Surveillance, and Reconnaissance (C4ISR) guidance. Conduct associated IUSS C4ISR operating system, technical, and information architecture studied and analysis.

2. (U) FY 1999 PLANS:

- (U) (\$ 5,054) Initiate development of a common IUSS processing architecture; to include signal, data, and display processing requirements generation, analysis, and contractual planning. Initiate incorporation of ARCI Advanced Processing Builds (APB)-1 architecture to support IUSS processing requirements.
- (U) (\$ 2,500) Continue investigations and analysis to support preparation of Environmental Impact Statement (EIS) for SURTASS.
- (U) (\$ 3,500) Continue LFA development and integration of signal/data processing software for littoral/shallow water operations and T-AGOS 23 initial at-sea testing and preparation for Pre-DT testing.

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Exhibit R-2a, RDT&E Budget Item Justification x0766

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EXHIBIT R-2a, FY2000 RDT&E BUDGET PROJECT JUSTIFICATION SHEET DATE: FEB 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204311N

PROJECT NUMBER: X0766
PROGRAM ELEMENT TITLE: Integrated Surveillance System PROJECT TITLE: IUSS

- (U) (\$ 1,029) Upgrade SURTASS communications capabilities to comply with Naval Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) guidance. Develop capability for increased data transmissions to shore.
- (U) (\$ 2,500) Prototype, define, and incorporate a common Operator Machine Interface (OMI) for SURTASS and SSIPS/SDS legacy systems.
- (U) (\$ 900) Conduct Sea Test Planning for T-AGOS 23 DT/OT testing.
- 3. (U) FY 2000 Plans:
 - (U) (\$ 4,100) Continue design and development of software to transition IUSS to a common processing architecture.
 - (U) (\$ 1,500) Continue scientific research program to support operational deployment of LFA.
 - (U) (\$ 1,600) Conduct DT/OT testing of T-AGOS 23 SURTASS/LFA system.
 - (U) (\$ 2,600) Continue LFA development and integration in support of DT/OT testing of T-AGOS 23 SURTASS/LFA system. Correct software issues identified during conduct of DT/OT testing.
 - (U) (\$ 1,771) Complete transition of SURTASS and SSIPS/SDS to a common OMI. Complete Factory Acceptance Testing (FAT) at each developer facility and install into fielded legacy systems. Prototype requested fleet enhancements to common OMI baseline.
 - (U) (\$ 426) Continue integration of IUSS into the Fleet C4ISR architecture.

B. (U) PROGRAM CHANGE EXPLANATION:

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Exhibit R-2a, RDT&E Budget Item Justification x0766

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EXHIBIT R-2a, FY2000 RDT&E BUDGET PROJECT JUSTIFICATION SHEET DATE: FEB 1999

PROJECT NUMBER: X0766
PROJECT TITLE: IUSS

PROGRAM ELEMENT: 0204311N
PROGRAM ELEMENT TITLE: Integrated Surveillance System

BUDGET ACTIVITY: 7

(U) Funding: FY98 decreased by \$171K for FY98 SBIR tax reduction. FY99-00 funding decreased 1.5% for non pay inflation.

(U) Schedule/Technical: In FY98, there was a delay in completing C4ISR analysis.

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands)

	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	TO	TOTAL
	ACTUAL	ESTIMATE	ESTIMATE	ESTIMATE	ESTIMATE	ESTIMATE	ESTIMATE	ESTIMATE	COMPLETE	PROGRAM
OPN# 2225	2,328	0	0	0	0	0	0	28,046	CONT.	CONT.
OMN 1C3C	27,191	29,010	28,748	30,327	30,160	31,498	33,505	40,406	CONT.	CONT.
OPN# 2237	4,571	12,659	7,267	5,594	17,456	9,464	19,721	24,656	CONT.	CONT.

(U) RELATED RDT&E:

- (U) PE 0204311N(Integrated Surveillance System)
- (U) PE 0603785N(Combat Systems Oceanographic Performance Assessment)
- (U) PE 0603747N(Undersea Warfare Advanced Technology)

D. (U) ACQUISITION STRATEGY:

Program
Milestones

FY 1998 FY 1999 FY 2000

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EXHIBIT R-2a, FY2000 RDT&E BUDGET PROJECT JUSTIFICATION SHEET DATE: FEB 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0204311N PROJECT NUMBER: X0766
PROGRAM ELEMENT TITLE: Integrated Surveillance System PROJECT TITLE: IUSS

Engineering
Milestones

T&E
Milestones

Contract
Milestones

*Build #2 LITTORAL
IMPROV 9/98*

SDS OPEVAL 1Q/99 T-AGOS 23
DLVRY 10/99
SEA TESTS;
DT-6/00, OT-8/00

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EXHIBIT R-3, FY2000 RDT&E COST ANALYSIS

DATE: FEB 1999

PROGRAM ELEMENT: 0204311N

PROJECT NUMBER: X0766

BUDGET ACTIVITY: 7

Exhibit R-3 Cost Analysis (page 1)							Date: Jan 1999		
RDT&E/Budget Activity 7			PROGRAM ELEMENT: 0204311N				SURTASS x0766		
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Cost	FY99 Award Date	FY00 Award Date	Cost To Complete	Total Cost	Target Value of Contract
IUSS Common Architecture	CPFF	RSC/LM	14948	4000	12/98	2415	1/00	Cont.	9,119
Environmental Research	WR	ONR	2000	2000	10/98	1500	12/99	Cont.	4,800
LFA Improvements	CPFF	RSC/LS	73238	5000	10/98	4113	12/99	Cont.	13,413
C4I Integration	CPFF	MISC	29395	1841	1/99	1100	1/00	Cont.	4,041
Various	WX	MISC	27395	1492	10/98	1056	10/99	Cont.	3,837
Subtotal Product Development			146976	14333		10184			35,210
Remarks:									
RSC= Raytheon Systems Co. Fullerton, CA									
LM= Lockheed Martin, Manassas, VA									
TRW=TRW Systems Div., San Diego, CA									
L/S= Lockheed Sanders, Nashua, NH									
IUSS Common Arch.	WX	Various	840	150	11/98	160	11/99	Cont.	480
LFA Improvements	CPFF	TRW	2099	325	12/98	395	12/99	Cont.	1115
C4ISR Integration	CPFF	TRW	1259	100	12/98	168	12/99	Cont.	429
Subtotal Support			4198	575		723			2,024

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EXHIBIT R-3, FY2000 RDT&E COST ANALYSIS

DATE: FEB 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204311N

PROJECT NUMBER: X0766

Remarks

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Exhibit R-3, RDT&E PROJECT COST ANALYSIS

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EXHIBIT R-2a, FY2000 RDT&E BUDGET PROJECT JUSTIFICATION SHEET DATE: FEB 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0204311N PROJECT NUMBER: X0758

PROGRAM ELEMENT TITLE: INTEGRATED SURVEILLANCE SYSTEM

Exhibit R-3 Cost Analysis (page 2)										Date: Jan 1999	
RDT&E/Budget Activity 7			PROGRAM ELEMENT: 0204311N							SURTASS x0766	
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date	Cost To Complete	Total Cost	Target Value of Contract	
IUSS Common Architecture	Var/WX	MISC.	651	0	Var.	0	Var.	Cont.		245	
LFA Improvement	Var/WX	MISC.	1520	475	Var.	990	Var.	Cont.		1,715	
Subtotal T&E			2171	475		990		Cont.		1,960	
Remarks											
LFA Improvements/C4ISR	Var/WX	MISC.	1050	100	Var.	100	Var.	Cont.		300	
Subtotal Management			1050	100		100		Cont.		300	
Remarks											
Total Cost			154395	15,483		11,997				39,494	
Remarks											

(Exhibit R-3, page 2 of 2)

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EXHIBIT R-2a, FY2000 RDT&E BUDGET PROJECT JUSTIFICATION SHEET DATE: FEB 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0204311N PROJECT NUMBER: X0758
 PROGRAM ELEMENT TITLE: INTEGRATED SURVEILLANCE SYSTEM

PROJECT NUMBER & TITLE	FY1998 ACTUAL	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM CONT.
X0758 SURTASS	1,231	3,889	6,028	6,400	5,788	6,881	7,781	7,947	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The SURTASS project comprises the mobile, tactical arm of the Integrated Undersea Surveillance System, providing long range detection and cueing for tactical weapons platforms against both diesel and nuclear powered submarines. With the SOSUS Arrays being placed in a standby status (data available but not continuously monitored), SURTASS must provide the undersea surveillance necessary to support regional conflicts and sea-lane protection. SURTASS has experienced recent passive and active success against diesel submarines operating in shallow water. SURTASS is greatly reducing costs by consolidating logistics support, using Non-Developmental Items and commercial hardware, and increasing operator efficiency through computer aided detection and classification processing. SURTASS development efforts include: twin-line array processing, improved detection and classification/passive automation to counter quieter threats; additional signal processing and bi-static active capability; integrated active and passive operations; improved Battle Group support; and improved information processing. Functional improvements are delivered to the Fleet in software "Builds". Build #1 (FY 95) included source-set formulation and analysis tools, automated line trackers and nuclear source auto-detector. Build #2 (FY 96) included wideband energy trackers, wideband/narrowband feature association, and diesel Full Spectrum Processing (FSP). Build #3 (FY 97) includes automated localization and tracking, diesel automated detectors. Build #4 (FY 98) includes twin-line integration, automated classification aids that provide surface/subsurface target discrimination and subsurface target classification clues. Build #5(FY 99) includes bi-static LFA signal processing and integration of active and passive information processing subsystems to improve contact association and geographic tracking performance.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1998 ACCOMPLISHMENTS:
 (U) (\$ 1,231) Continued signal processing improvements.

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EXHIBIT R-2a, FY2000 RDT&E BUDGET PROJECT JUSTIFICATION SHEET

DATE: FEB 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204311N

PROJECT NUMBER: X0758

PROGRAM ELEMENT TITLE: INTEGRATED SURVEILLANCE SYSTEM

2. (U) FY 1999 PLANS:

- (U) (\$ 1,700) Continue software development for computer aided detection and classification including improvements to nuclear and diesel auto-detectors, integration of active and passive information processing, improved classification aids and Bi-static processing.
- (U) (\$ 800) Continue array improvements and integration and expanded array interoperability
- (U) (\$ 1,389) Software development to support increased data processing on shore to support tactical operations.
- 3. (U) FY 2000 PLANS:
 - (U) (\$ 1,010) Develop processing improvements to support transition to TB-29 common towed array and expand array interoperability.
 - (U) (\$ 1,715) Complete software development to support increased data processing on shore to support tactical operations.
 - (U) (\$ 1,100) Continue computer aided detection, classification and tracking to improve passive performance to support tactical operations in high clutter environments.
 - (U) (\$ 1,003) Continue software development to improve Bi-Static operations in littoral/shallow water regions.
 - (U) (\$ 1,200) Develop software to transition to Common Processor.

- B. (U) PROGRAM CHANGE SUMMARY: The FY1999 President's Budget for FY 1998 was \$1,265K with a subsequent reduction of \$-17K for SBIR. FY00 increased \$1,200K for software development to transition to Common Processor.

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EXHIBIT R-2a, FY2000 RDT&E BUDGET PROJECT JUSTIFICATION SHEET DATE: FEB 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0204311N PROJECT NUMBER: X0758

PROGRAM ELEMENT TITLE: INTEGRATED SURVEILLANCE SYSTEM

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands)

	FY1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	TO	TOTAL
	ACTUAL	ESTIMATE	ESTIMATE	ESTIMATE	ESTIMATE	ESTIMATE	ESTIMATE	ESTIMATE	COMPLETE	PROGRAM
OPN #2237	4,571	12,659	7,267	5,594	17,456	9,464	19,721	24,656	CONT.	CONT.

(U) RELATED RDT&E:

- (U) PE 0204311N(Integrated Surveillance System)
- (U) PE 0603785N(Combat Systems Oceanographic Performance Assessment)
- (U) PE 0603747N(Undersea Warfare Advanced Technology)

D. (U) ACQUISITION STRATEGY:

	FY 1998	FY 1999	FY 2000
Program			
Milestones	BUILD #4	BUILD #5	
Engineering	COMPUTER AIDED	INTEGRATED	
Milestones	DET/CLASS	PASSIVE IP	
T&E		SEA TEST	
Milestones		INTEGRATED	
Contract		TWIN-LINE	
Milestones			

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EXHIBIT R-3, FY2000 RDT&E COST ANALYSIS

DATE: FEB 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0204311N

PROJECT NUMBER: x0758

Exhibit R-3 Cost Analysis (page 1)										Date: Jan 1999	
RDT&E/Budget Activity 7			PROGRAM ELEMENT: 0204311N							SURTASS x0758	
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY's Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date	Cost To Complete	Total Cost	Target Value of Contract	
Passive Auto	CPFF	RSC/APL	21735	250	12/98	1120	12/99	Cont.		3,015	
Array Improvements	CPFF/WR	RSC/APL/SSC	14696	750	3/99	800	3/00	Cont.		2,600	
Processing Improvements	CPFF	RSC/APL	21531	1250	1/99	2203	1/00	Cont.		4,853	
Various	Var/WX	MISC.	14490	589	10/98	650	10/99	Cont		2,289	
Subtotal Product Development			72452	2,839		4,773				12,757	
Remarks: APL=APL/JHU RSC= Raytheon Systems Co. SSC= SPAWAR Systems Center.											
Passive/Array improvements	Var/WX	MISC	1627	150	10/98	250	10/99	Cont.		650	
Subtotal Support			1627	150		250				650	
Remarks											

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EXHIBIT R-3, FY2000 RDT&E COST ANALYSIS

DATE: FEB 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0204311N

PROJECT NUMBER: x0758

Exhibit R-3 Cost Analysis (page 2)											Date: Jan 1999	
RDT&E/Budget Activity 7				PROGRAM ELEMENT: 0204311N							SURTASS x0758	
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date	Cost To Complete	Total Cost	Target Value of Contract		
Passive/Array improvements	Var/WX	MISC.	2126	800	10/98	905	10/99	Cont.		2,610		
Subtotal T&E			2126	800		905				2,610		
Remarks												
Passive/Array improvements	Var/WX	MISC.	407	100	10/98	100	10/99	Cont.		300		
Subtotal Management			407	100		100				300		
Remarks												
Total Cost			76612	3,889		6,028				16,317		
Remarks												

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(Exhibit R-3, page 2 of 2)

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Exhibit R-3, Project Cost Analysis

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Exhibit R-2, RDT&E Budget Item Justification			Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E/BA7	Program Element Name & No. 0204413N/Amphibious Tactical Support Units	Project Name and Number. 21980/Amphibious Other C2	

COST (\$ in Millions)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
21980 Amphibious Other C2	0	0	0	2.952	7.872	.983	0	0	CONT.	CONT.
22231 MCAC Weapons Development	.649	1.869	0	0	0	0	0	0	CONT.	CONT.
Total P.E. Cost	.649	1.869	0	2.952	7.872	.983	0	0	CONT.	CONT.

A. Mission Description and Budget Item Justification:

21980 – This project supports development and procurement of a technologically advanced heavy lift utility landing craft to complement the high speed, over-the-beach, ship-to-shore amphibious life of the future.

22231 – Landing Craft Air Cushion (LCAC) control enhancements initiates studies that will provide a remote control capability for LCAC and will be integrated and scheduled with developing minesweeping and shallow water mine-countermeasures systems. LCAC deep skirt will provide an improved LCAC performance in Sea State 3 and higher and improved capability near and in the surf zone for explosive lane breaching missions in support of amphibious operations.

B. Program Change Summary:

FY 1999 President's Budget Appropriated Value:	FY 1998	FY 1999	FY 2000
Adjustment to FY 1998/1999 Appropriated Value/	.645	1.945	3.449
FY 1999 President's Budget:	.645	1.945	
a. Minor adjustments	+004	-.076	
b. MCAC			-3.449
FY 2000 PRES Budget Submit	.649	1.869	0

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Exhibit R-2, Budget Item Justification
(Exhibit R-2, Page 1 of 4)

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Exhibit R-2a, RDT&E Project Justification		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E/BA7	Program Element Name & No. 0204413N/Amphibious Tactical Support Units	Project Name and Number. 21980/Amphibious Other C2

COST (\$ in Millions)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Total P.E. Cost										
LCU Replacement	0	0	0	2,952	7,872	.983	0	0	CONT.	CONT.
Quantity of RDT&E Articles & cost										

A. Mission Description and Budget Item Justification: This project supports development and procurement of a technologically advanced heavy lift utility landing craft to complement the high speed, over-the-beach, ship-to-shore amphibious lift of the future.

FY 1998 ACCOMPLISHMENTS: Not applicable
 FY 1999 PLAN: Not applicable
 FY 2000 PLAN: Not applicable

B. Other Program Funding Summary

	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Complete	Total Cost
SCN Line 510000 Service Craft	0	0	0	0	0	0	59,807	59,743	CONT.	CONT.

(U) Related RDT&E: Not applicable

C. Acquisition Strategy: Feasibility studies will be conducted to determine the best design to meet Navy new requirements for heavy lift utility landing craft and to support a performance specification that will be competitively awarded.

D. Schedule Profile:

FY00 To Complete

Program Milestones

- Mission needs statement approval
- Assessment of alternatives
- Evaluation of feasibility of alternatives
- Enabling technology studies

Engineering Milestones

T&E Milestones

Contract Milestones

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Exhibit R-2a, Project Justification
 (Exhibit R-2a, Page 2 of 4)

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APPROPRIATION/BUDGET ACTIVITY		Exhibit R-3, RDT&E Project Cost Analysis				Date: February 1999
RDT&E/BA7	0204413N/Amphibious Tactical Support Units	Program Element Name & No.		Project Name and Number.		
		0204413N/Amphibious Tactical Support Units		21980/Amphibious Other C2		

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Award Date	FY00 Award Date	FY00 Cost	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development	WR	NSWCBethesda, MD					4.014	4.014	
Ancillary Hardware Development	WR	NSWCBethesda, MD					2.007	2.007	
Systems Engineering	WR	NSWCBethesda, MD					2.834	2.834	
Licenses									
Tooling									
GFE									
Award Fees									
Subtotal Product Development							8.858	8.858	

Remarks:

Development Support Equipment									
Software Development									
Training Development									
Integrated Logistics Support									
Configuration Management									
Technical Data									
GFE									
Subtotal Support			N/A	N/A	N/A	N/A	N/A	N/A	N/A

Remarks:

Developmental Test & Evaluation									
Operational Test & Evaluation									
Tooling									
GFE									
Subtotal T&E			N/A	N/A	N/A	N/A	N/A	N/A	N/A

Remarks:

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Exhibit R-3, Project Cost Analysis
(Exhibit R-3, Page 3 of 4)

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Exhibit R-3, RDT&E Project Cost Analysis			Date: February 1999
APPROPRIATION/BUDGET ACTIVITY	Program Element Name & No.	Project Name and Number.	
RDT&E/BA7	0204413N/Amphibious Tactical Support Units	21980/Amphibious Other C2	

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Contractor Engineering Support										
Government Engineering Support	WR	NSWCBethesda, MD						2.007	2.007	
Program Management Support		Various						.942	.942	
Program Management Personnel										
Travel										
Labor (Research Personnel)										
Overhead										
Subtotal Management								2.949	2.949	
Remarks:										
Total Cost								11.807	11.807	
Remarks:										

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Exhibit R-3, Project Cost Analysis
(Exhibit R-3, Page 4 of 4)

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EXHIBIT R-2, FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204571N

PROGRAM ELEMENT TITLE: Consolidated Training Systems Development

(U) COST: (Dollars in Thousands)

Project Number & Title	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete	Total Program
21427 Surface Tactical Team Trainer (STTT)	10,392	11,931*	4,361	4,660	5,855	5,953	6,571	7,220	CONT.	CONT.
21823 Training and Modeling Systems (TMS)	8,217	0	0	0	0	0	0	0	0	CONT.**
W0431 Tactical Aircrew Combat Training System (TACTCS)	3,267	2,934	2,747	1,714	0	0	0	0	0	57,256***
W0604 Training Range and Instrumentation Development (TRID)	4,056	2,113	1,635	3,425	4,389	3,636	3,644	3,645	CONT.	CONT.
W1998 Joint Tactical Combat Training System (JTCTS)	31,277	9,412****	7,871	7,933	6,048	5,115	5,244	5,363	CONT.	CONT.
W2124 Air Warfare Training Development (AWTD)	1,719	1,847	2,131	2,192	1,961	2,189	2,246	2,298	CONT.	CONT.
X1823 Training and Training Devices Systems (TTDS)	840	0	0	0	0	0	0	0	0	13,619*****
X1823 Training and Modeling Systems (TMS)	0	9,989	8,209	10,565	9,063	8,601	7,437	7,610	0	61,474
TOTAL	59,768	38,226	26,954	30,489	27,316	25,494	25,142	26,136	CONT.	CONT.

Quantity of RDT&E Articles

* Controls reflect a FY99 \$6.0M Congressional add for Battle Force Tactical Training (BFTT) executed under 22449.

** Program transferred to SPAWAR (X1823).

*** This amount includes FY90-FY01.

**** Controls reflect a FY99 \$2.5M Congressional add for Large Area Tracking Range (LATR)/Kadena Interim Training System (KITS) integration technical evaluation to be executed under project unit W2660.

***** This amount includes FY94-FY98.

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Exhibit R-2 RDT&E Budget Item Justification
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EXHIBIT R-2, FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204571N

PROGRAM ELEMENT TITLE: Consolidated Training Systems Development

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The STTT will develop the Battle Force Tactical Training (BFTT) System to provide realistic joint warfare training including a means to link ships together for coordinated Combat System team training using Distributed Interactive Simulation (DIS) protocols. The TMS encompasses the requirements analysis and software development associated with the Navy's Maritime Development Agent function as part of the Joint Simulation System (JSIMS). The BFTT will develop the BFTT Electronic Warfare Trainer (BEWT) and applicable BFTT system software to provide EW operator and team training for Fleet EW Systems. TACTS provides real-time monitoring and post-exercise debrief of aircrews flying on instrumented training ranges. This system is the primary training tool used by the Naval Strike and Air Warfare Center and the Marine Aviation Weapons and Tactics Squadron. The TRID program provides development of many range systems including range electronic warfare simulator, advanced weapons training systems, laser training systems, Large Area Tracking Range (LATR), and shallow water range technology. JTCTS is planned to provide U.S. Navy fleet deployable instrumentation for at sea surface, subsurface, and air training and tactics development and fixed/transportable air range instrumentation for U.S. Navy and U.S. Air Force air training and tactics development. JTCTS incorporates the Defense Modeling and Simulation Office sponsored Distributed Interactive Simulation Protocol Data Unit for interoperability with Navy and other service live, virtual (simulators), and constructive (war games) simulations. JTCTS will initially deliver prototype hardware/software for a mobile/rangeless capability for a Carrier Air Wing 5 (CAG-5) after undergoing development/operational testing. It will further develop test and field fixed air range and fixed fleet range hardware/software in subsequent phases of the program. This summary reflects only the USN funding component of the JTCTS. The AWTG program provides development of many aviation training systems including, mission rehearsal simulation technologies and the Aviation Training Technology Integration Facility (ATTIF). TTDS provides a geographically distributed wargaming system for littoral operations training which supports objectives of Fleet Commanders, Naval War College, Joint Warfare Center, and Tactical Training Groups in wargaming, tactical decision making training, and tactics development and evaluation.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it encompasses engineering and manufacturing development for upgrade of existing, operational systems.

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Exhibit R-2 RDT&E Budget Item Justification
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APPROPRIATION/BUDGET ACTIVITY		Exhibit R-2a, RDT&E Project Justification		Date: February 1999
RDT&E/BA7		Program Element Name & No. 0204571N/	Project Name and Number.	
		Consolidated Training Systems Development	Surface Tactical Team Trainer (STTD)/21427	

Cost (\$ in Millions)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Project Cost	10.392	5.945	4.361	4.660	5.855	5.953	6.571	7.220	CONT.	CONT.
RDT&E Articles Qty	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

A. Mission Description and Budget Item Justification. The Battle Force Tactical Training (BFTT) Program provides realistic joint warfare training across the spectrum of armed conflict; realistic unit level team training in all warfare areas; a means to link ships together which are in different homeports for coordinated training; external stimulation of shipboard training systems; and simulation of non-shipboard forces. BFTT uses a distributed architecture, integrating existing training systems, and uses Distributed Interactive Simulation (DIS) protocols, with planned migration to High Level Architecture (HLA). BFTT provides ships' Commanding Officers and Battle Group/Battle Force Commanders with the ability to conduct coordinated realistic, high stress, combat system team training as an integral part of the Afloat Training Organization. BFTT provides a baseline capability/system that meets the Operational Requirements Document (ORD). The Mine Warfare Model (MW Model) will provide integration of the Minefield Environmental Server (Mine Warfare) capability into BFTT. Stimulator/Simulators (STIM/SIM) provides standardized Radio Frequency (RF), Intermediate Frequency (IF), and/or Digital injection into surface ship radars and fire control systems for training of shipboard operators/teams as part of the BFTT System. The Cryptologic Systems Trainer (CST)/BFTT Electronic Warfare Trainer (BEWT) development effort will provide embedded operator and team electronic emissions recognition training capability, integrated into BFTT.

FY 1998 ACCOMPLISHMENTS:

- (\$2.859) BFTT B/L 1 - Developed software required as a result of lessons learned/additional Fleet requirements since BFTT IOC to include the rehosted AEGIS Combat Training System (ACTS), completed software development of the modifications required to incorporate amphibious/littoral functionality into BFTT software, and initiated HLA system engineering requirements/development.
- (\$3.328) Mine Warfare - Completed development of the software modifications required to integrate the Mine Warfare capability.
- (\$1.589) STIM/SIM - Continued development of the MK 91 NATO Sea Sparrow Missile System Stimulator.
- (\$900) CST/BEWT - Continued development of the BFTT Electronic Warfare Trainer (BEWT) and software integration with BFTT.
- (\$4.716) BEWT - Continued development of the BEWT capability and installed/demonstrated Engineering Development Models on Fleet directed surface ships.

FY 1999 PLANS:

- (\$1.257) BFTT - Develop software required as a result of lessons learned/additional Fleet requirements since BFTT IOC to include SG&C, Display & Debrief, Entity Motioning and Modeling (EM&M) improvements and the initial interface to the Generic Navy Stimulator/Simulator (GNSS).
- (\$500) BFTT/HLA - Initiate conversion of the DIS protocol based software to the HLA mandated architecture for the Performance Monitoring portion of the BFTT software in accordance with DoD directives.
- (\$1.688) STIM/SIM - Complete development of the MK 91 NATO Sea Sparrow Missile System Stimulator.
- (\$2.500) - BEWT - Integrate the BEWT into BFTT.

FY 2000 PLANS:

- (\$1.861) BFTT - Develop tactical link interface/simulation software and integrate Semi Automated Forces (SAF) software into BFTT. Develop stand-alone objective based training software for scenario development.

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Exhibit R-2a RDT&E Project Justification
(Exhibit R-2a, Page 3 of 35)

APPROPRIATION/BUDGET ACTIVITY	Exhibit R-2a, RDT&E Project Justification	Date: February 1999
RDT&E/BA7	<p>Program Element Name & No. 0204571N/ Consolidated Training Systems Development</p> <p>Project Name and Number. Surface Tactical Team Trainer (STTT)/21427</p>	

- (\$2.500) HLA - Continue conversion of the DIS protocol based software to the HLA mandated architecture for the Scenario Generation and Control portion of the BFTT software in accordance with DoD directives.

FY 1999 President's Budget:			
Appropriated Value:	10,624	5,964	1,165
Adjustment to FY 1998 Appropriated Value/ FY 1999 President's Budget	9,948		
(a) Undistributed Reductions	- .013		+2,500
(b) SBIR	- .219		- .006
(c) Training Initiatives			+ .049
(d) Outsourcing Adjustment			
(e) NWC/F Rates			
(f) Revised Economic Assumptions		- .014	
(g) Civilian Personnel Underexecution		- .005	
(h) Civilian Pay Rates			+ .706
(i) Non Pay Inflation			- .053
FY 2000/01 PRES Budget Submit:	10,392	5,945	4,361

Funding: The FY 1998 net decrease of -\$232M is a result of undistributed reductions (\$.013M) and a Small Business Innovative Research (SBIR) reduction of (\$.219M). The FY 1999 net decrease of (\$.019M) is a result of revised economic assumptions (\$.014M) and a civilian personnel underexecution cut of (\$.005M). The FY 2000 net increase of +\$.196M is a result of +\$.2500M provided for Training Initiatives, a (\$.006M) Outsourcing Adjustment, a +.049M NWCFF Rate increase, a civilian pay rate increase of +.706M, and a non pay inflation decrease of (\$.053M). Note: Training Initiatives address the conversion of the BFTT DIS software to the DoD mandated HLA.

Technical: Not Applicable.

C. Other Program Funding Summary:										
	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	To FY 2004	Total FY 2005	Complete	Cost
OPN Line 276200	20.029	24.099	31.615	17.544	38.174	24.709	25.252	25.661	CONT.	CONT.
O&MN Line 3B4K	8.057	9.809	9.083	9.969	9.590	9.463	9.704	9.952	CONT.	CONT.

Related RDT&E: Not Applicable.

Exhibit R-2a RDT&E Project Justification
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Exhibit R-2a, RDT&E Project Justification		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E/BA7	Program Element Name & No. 0204571N/ Consolidated Training Systems Development	Project Name and Number. Surface Tactical Team Trainer (STTT)/21427

D. Acquisition Strategy: The BFTT Program is designated as an ACAT IV-M Program consisting of four (4) phases - Concept Exploration and Definition, Demonstration and Validation, Engineering and Manufacturing Development, and Production and Deployment.

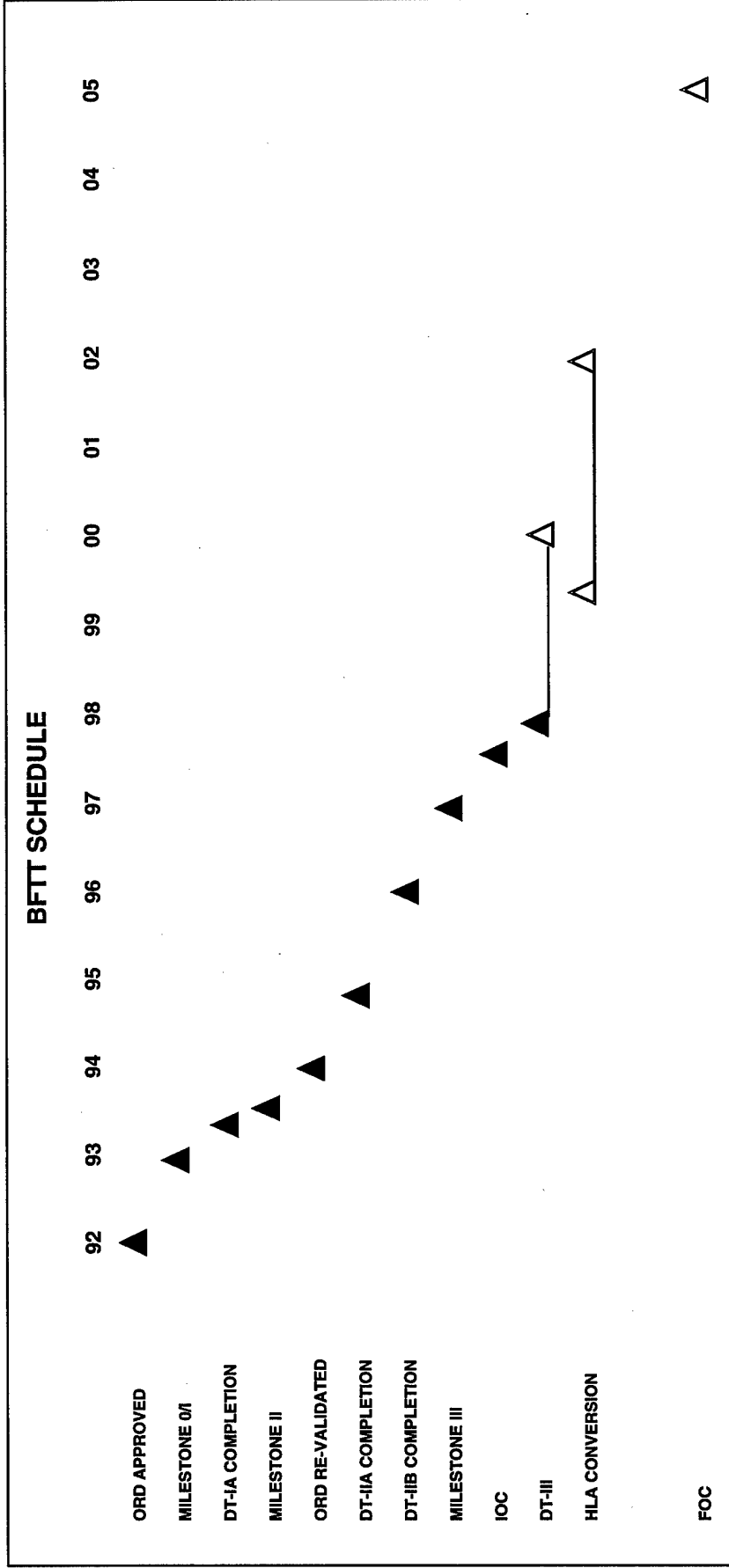
E. Schedule Profile:

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Exhibit R-2a RDT&E Project Justification
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Exhibit R-2a, RDT&E Project Justification		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY	Program Element Name & No. 0204571N/ Consolidated Training Systems Development	Project Name and Number. Surface Tactical Team Trainer (STTT)/21427
RDT&E/BA7		



Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Award Date	FY99 Cost	FY00 Award Date	FY00 Cost	FY01 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development	**	AAI/MD, EWA/WV	10.024	**	1.490		0			11.514	11.514
Ancillary Hardware Development	WR/RCP	MULTIPLE	11.101		.695		.650		CONT	CONT	N/A
Systems Engineering	WR/RCP	MULTIPLE	1.950		.062		.025		CONT	CONT	N/A
Licenses											

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204571N

PROGRAM ELEMENT TITLE: Consolidated Training Systems Development

PROJECT NUMBER: W0431

PROJECT TITLE: Tactical Aircrew Combat Training System (TACTS)

(U) COST: (Dollars in Thousands)

<u>Project Number & Title</u>	<u>FY 1998 Budget</u>	<u>FY 1999 Budget</u>	<u>FY 2000 Estimate</u>	<u>FY 2001 Estimate</u>	<u>FY 2002 Estimate</u>	<u>FY 2003 Estimate</u>	<u>FY 2004 Estimate</u>	<u>FY 2005 Estimate</u>	<u>To Complete</u>	<u>Total Program</u>
W0431 Tactical Aircrew Combat Training System (TACTS)	3,267	2,934	2,747	1,714	0	0	0	0	0	57,256*
TOTAL	3,267	2,934	2,747	1,714	0	0	0	0	0	57,256*

Quantity of RDT&E Articles

* This amount includes FY90-FY01.

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project develops new TACTS capabilities primarily through the integration of additional types of aircraft and weapons. This requires development of new aircraft interfaces, weapons and countermeasures simulations, and modifications to displays. Software is also developed to produce computer generated Electronic Warfare (EW) threats to enhance the system's ability to provide training in a realistic EW environment. Various other system performance improvements are also developed to make the system more effective and reliable.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1998 ACCOMPLISHMENTS:

- (U) (\$ 755) Weapons Integration - Completed the development of the Phoenix training capability for the F-14. Resumed development of a Joint Stand-Off Weapon (JSOW) training capability.
- (U) (\$2,379) System Upgrades - Continued development of block 5.2 (formerly referred to as 6.0) software for the Control and Computation Subsystem (CCS) and A10 software for the P4A Aircraft Instrumentation Subsystem (AIS). Completed development of the Advanced Message Oriented Data Security Module (AMODSM).
- (U) (\$ 133) Studies/Analysis/T&E - Developed test procedures for testing block 5.2 and A10 software.

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Exhibit R-2a RDT&E Project Justification
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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204571N

PROGRAM ELEMENT TITLE: Consolidated Training Systems
Development

PROJECT NUMBER: W0431

PROJECT TITLE: Tactical Aircrew Combat Training
System (TACTS)

2. FY 1999 PLAN:

- (U) (\$1,000) Weapons Integration - Continue development of a training capability for JSOW.
- (U) (\$1,649) System Upgrades - Continue development of block 5.2 (formerly referred to as 6.0) software for CCS and A10 software for P4A AIS.
- (U) (\$ 240) Studies/Analysis/T&E - Test block 5.2 CCS and A10 software.
- (U) (\$ 45) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. FY 2000 PLAN:

- (U) (\$ 827) Weapons Integration - Complete development of the JSOW training capability for the F/A-18. Develop a similar training capability for the Joint Direct Attack Munitions (JDAM) weapon.
- (U) (\$1,645) System Upgrades- Complete the development of block 5.2 CCS software and A10 P4A AIS software. Develop software modifications to enable the system to use F/A-18 and AV-8B navigation data to improve the TACTS tracking solution in areas of marginal range coverage. Develop block 6.0 software for the CCS and Advance Display and Debriefing Subsystem (ADDS), and block A05 and K05 software for the two variants of the AIS Internal (AISi).
- (U) (\$ 275) Studies/Analysis/T&E - Complete any follow-up testing of the block 5.2 CCS software and block A10 P4A AIS software. Develop test procedures for testing block 6.0 CCS/ADDS software and A05/K05.

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Exhibit R-2a RDT&E Project Justification
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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0204571N PROJECT NUMBER: W0431
PROGRAM ELEMENT TITLE: Consolidated Training Systems Development PROJECT TITLE: Tactical Aircrew Combat Training System (TACTS)

(U) B. PROGRAM CHANGE SUMMARY

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
(U) FY 1999 President's Budget:	3,367	3,069	4,934
(U) Appropriated Value:	3,512	3,069	
(U) Adjustments from President's Budget:	-100	-135	-2,187
(U) FY 2000 President's Budget Submit:	3,267	2,934	2,747

CHANGE SUMMARY EXPLANATION:

(U) Funding: The FY98 decrease of -\$100 thousand is based on a \$65 thousand reduction for Small Business Innovative Research (SBIR) Assessment, a \$38 thousand reduction for a Navy reprioritization of requirements and a \$3 thousand increase for minor pricing adjustments. The FY99 decrease of -\$135 thousand reflects Congressional undistributed reductions. The FY00 decrease of -\$2,187 thousand is based on a \$133 thousand reduction for Full Institutional Funding for Major Range Test Facility Base (MRTFB) indirect cost, a \$2,012 thousand realignment in support of the Joint Tactical Combat Training System (JTCTS) and the Training Range and Instrumentation Development (TRID) programs and a \$42 thousand reduction due to Congressional undistributed reductions.

(U) Schedule: The following milestones have been changed due to program restructure:

From	To
A10 DT-II 1Q-4Q/99	A10 DT-II 4Q99/1Q00
Blk 6.0 DT II 1Q-4Q/99	Blk 5.2 DT-II 4Q99/1Q00

"Block 6.0" has been changed to "Block 5.2" to reflect the revised version number for the next CCS software build.

The following milestones have been added: A05/K05 DT-II 2Q-3Q/01
Blk 6.0 DT-II 2Q/3Q/01

(U) Technical: Not Applicable.

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0204571N PROJECT NUMBER: W0431
PROGRAM ELEMENT TITLE: Consolidated Training Systems Development PROJECT TITLE: Tactical Aircrew Combat Training System (TACTS)

(U) C. OTHER PROGRAM FUNDING SUMMARY: N/A

Related RDT&E

(U) P.E. PE 0604735F (Range Improvement) - Includes funding for joint efforts with USAF.

(U) C. ACQUISITION STRATEGY: The TACTS program is a non-ACAT program. The integrated program teams that develop new TACTS capabilities include contractors whose products and services are obtained by means of competitive award, indefinite deliveries/indefinite quantity (IDIQ), and cost-type contracts. Individual delivery orders are awarded for specific development efforts.

(U) D. SCHEDULE PROFILE

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>To Complete</u>
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(U) Program Milestones

(U) Engineering Milestones

(U) T&E Milestones

1Q/2Q AMODSM DT-II	4Q99/1Q00 A10 DT-II 4Q99/1Q00 Blk 5.2 DT-II	2Q/3Q-01 A05/K05 DT-II 2Q/3Q-01 Blk 6.0 DT-II
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(U) Contract Milestones

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Exhibit R-2a RDT&E Project Justification
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EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204571N

PROJECT NUMBER: W0431
PROJECT TITLE: TACTS

<u>Cost Categories:</u>		Contract Method & Type	Performing Activity & Location	*Total Prior Yrs Cost	FY 1999 Award Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Miscellaneous		Various	Various	31,474	2,549	1Q/99	2,297	1Q/00	1,389	37,709	N/A
Subtotal Project Development				31,474	2,549	1Q/99	2,297	1Q/00	1,389	37,709	N/A
Remarks											
Miscellaneous		Various	Various	14,742	290	1Q/99	400	1Q/00	225	15,657	
Subtotal Support				14,742	290		400		225	15,657	
Remarks											
Miscellaneous		Various	Various	3,645	50	1Q/99	50	1Q/00	100	3,845	N/A
Subtotal Test & Evaluation				3,645	50		50		100	3,845	
Remarks											
Subtotal Management SBIR Assessment				0	0		0		0	0	45
Remarks					45						
Total Cost				49,861	2,934		2,747		1,714	57,256	

* This amount includes FY90-FY98.

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204571N

PROGRAM ELEMENT TITLE: Consolidated Training Systems

PROJECT NUMBER: W0604

PROJECT TITLE: Training Range and
Instrumentation Development
(TRID)

(U) COST: (Dollars in Thousands)

<u>Project Number & Title</u>	<u>FY 1998 Budget</u>	<u>FY 1999 Budget</u>	<u>FY 2000 Estimate</u>	<u>FY 2001 Estimate</u>	<u>FY 2002 Estimate</u>	<u>FY 2003 Estimate</u>	<u>FY 2004 Estimate</u>	<u>FY 2005 Estimate</u>	<u>To Complete</u>	<u>Total Program</u>
W0604 Training Range and Instrumentation Development (TRID)	4,056	2,113	1,635	3,425	4,389	3,636	3,644	3,645	CONT.	CONT.
TOTAL	4,056	2,113	1,635	3,425	4,389	3,636	3,644	3,645	CONT.	CONT.

Quantity of RDT&E Articles

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project develops specialized instrumentation systems for fleet readiness training while minimizing life cycle costs. Tasks include development of the following: electronic warfare simulators and associated subsystems, target control systems, Large Area Tracking Range (LATR) improvements, underwater technology, ranges interoperability and information architecture, shallow water range activity which includes establishment of capability at Pacific Missile Range Facility (PMRF SWTR) (Phase I) and in the Maui basin (Phase II) at Hawaii Island Shallow Water Training Range (HI SWTR), and assorted Advanced Weapons Training Systems (AWTS), such as Imaging Weapons Training Systems (IWTS), Weapons Impact Scoring Set (WISS), Remote Strafe Scoring System (RSSS), and weapon and countermeasure simulations for use with various range training systems.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1998 ACCOMPLISHMENTS:

- (U) (\$ 873) Completed development and testing of RSSS Product Improvement Program (PIP). Continued development of IWTS P³I.
- (U) (\$ 248) Completed support development and testing of Next Generation Target Control System (NGTCS).
- (U) (\$2,363) Continued technology development for CONUS shallow water ranges. Completed development and began installation of PMRF SWTR and continued development of HI SWTR.

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204571N

PROGRAM ELEMENT TITLE: Consolidated Training Systems

PROJECT NUMBER: W0604

PROJECT TITLE: Training Range and
Instrumentation Development
(TRID)

- (U) (\$572) Continued systems definitions, development of specifications, analysis of concepts, and systems engineering for developing improved interoperability among various projects. Continued systems engineering efforts for range integration using Defense Information Infrastructure standards (DIS) technology, continued development of common range architecture that meets High Level Architecture (HLA) standards, and conducted analyses of design data to ensure that Tactical Training Range (TTR) programs are logistically supportable.

2. FY 1999 PLAN:

- (U) (\$800) Complete development of IWTS P³I. Conduct testing and obtain MS III of RSSS PIP.
- (U) (\$495) Continue technology development for CONUS Shallow Water Ranges. Complete test and evaluation of PMRF SWTR.
- (U) (\$298) Continue systems definitions, development of specifications, analysis of concepts, and systems engineering for various projects. Continue systems engineering efforts for range integration and continue development of common range architecture that meets HLA standards. Conduct analyses of design data to ensure that TTR programs are logistically supportable.
- (U) (\$500) Commence development of Block 3.0 software upgrade LATR display system and LATR hardware/software capabilities for existing training systems.
- (U) (\$ 20) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. FY 2000 PLAN:

- (U) (\$527) Commence development of a singular display and debrief capability for all tactical training ranges systems to provide a common operating environment (COE) for the efficient life cycle support. This singular display and debrief capability will support the real-time and post exercise capability, as well as the Information Technology of 21st Century (IT-21) initiative. The capability will be based on machine independent code that can be hosted on personal computers.
- (U) (\$100) Commence development of the HLA and the Test and Training Enabling Network Architecture (TENA) for the tactical training ranges systems. The Architecture will provide for integration of the tactical training systems into a configuration which will establish the infrastructure for inter-service systems interoperability.

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204571N

PROGRAM ELEMENT TITLE: Consolidated Training Systems

PROJECT NUMBER: W0604

PROJECT TITLE: Training Range and
Instrumentation Development
(TRID)

- (U) (\$150) Begin the development of the modeling and simulation of the training ranges systems communications systems. Collect information and input this into the model to baseline the east coast and west coast communications systems.
- (U) (\$125) Conduct the operational research and systems engineering required to develop the transition plans necessary to integrate and transition legacy systems to the future systems.
- (U) (\$ 75) Commence development and integration of the tactical training ranges systems with the Command, Control, Communication, Computers and Information (C4I) Global Command and Control System (GCCS). This will provide the integration of information from all services into a command and control level depiction of the exercises/operations.
- (U) (\$ 75) Research integration of embedded instrumentation.
- (U) (\$583) Complete development of Block 3.0 software upgrade and commence development of Block 4.0 software upgrade for the LATR display debriefing system and LATR hardware/software capabilities for existing training systems.

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204571N

PROJECT NUMBER: W0604

PROGRAM ELEMENT TITLE: Consolidated Training Systems

PROJECT TITLE: Training Range and
Instrumentation Development
(TRID)

(U) B. PROGRAM CHANGE SUMMARY

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
(U) FY 1999 President's Budget:	9,133	2,195	1,734
(U) Appropriated Value:	9,315	2,195	
(U) Adjustments from President's Budget:	-5,077	-82	-99
(U) FY 2000 President's Budget Submit:	4,056	2,113	1,635

CHANGE SUMMARY EXPLANATION:

(U) Funding: The FY98 decrease of \$5,077 thousand reflects a \$5,000 thousand reduction for the PMRF Optical Sensors project that was transferred to program element 0603868C, a \$15 thousand reduction for Small Business Innovative Research (SBIR) assessment, and a reduction of \$62 thousand for minor program and pricing adjustments. The FY99 decrease of \$82 thousand reflects Congressional undistributed reductions. The FY00 decrease of \$99 thousand reflects minor pricing adjustments.

(U) Schedule: The following milestones have changed due to program restructure.

From	To
RSSS PIP MSIII 1Q/99	RSSS PIP MSIII 2Q/99
IWTS P ³ I DT-II 3Q/00-4Q/00	IWTS P ³ I DT-II 4Q/99-1Q/00

The following milestones have been added:

SWR Phase I IOC 1Q/99	
Block 3.0 LATR upgrade DT III 4Q/99	Block 3.0 LATR upgrade IOC 1Q/00
Block 4.0 LATR upgrade DT III 4Q/00	Block 4.0 LATR upgrade IOC 1Q/01

(U) Technical: Not Applicable.

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204571N

PROGRAM ELEMENT TITLE: Consolidated Training Systems

PROJECT NUMBER: W0604

PROJECT TITLE: Training Range and Instrumentation Development (TRID)

(U) C. OTHER PROGRAM FUNDING SUMMARY

Appn	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete
(U) OPN/P-1 Weapons Range Support Equipment	3,348	1,227	6,319	4,519	24,023	22,965	16,563	17,365	CONT.

Related RDT&E: Not Applicable.

(U) C. ACQUISITION STRATEGY: The TRID program is a non-ACT program. The integrated program teams that develop new TRID capabilities include contractors whose products and services are obtained by means of competitive award, indefinite deliveries/indefinite quantity (IDIQ), and cost-type contracts. Individual delivery orders are awarded for specific development efforts.

(U) D. SCHEDULE PROFILE

	FY 1998	FY 1999	FY 2000	To Complete
(U) Program Milestones		1Q SWR Phase I IOC		
(U) Engineering Milestones		2Q RSSS PIP MS III	1Q Block3.0 LATR Upgrade IOC	1Q-01 Block4.0 LATR Upgrade IOC
(U) T&E Milestones	1Q/98-4Q/98 RSSS PIP DT-II	4Q/99-1Q/00 P ³ DT-II 4Q Block 3.0 LATR Upgrade DT III	4Q Block 4.0 LATR Upgrade DT III	
(U) Contract Milestones				

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EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204571N

PROJECT NUMBER:
PROJECT TITLE:

W0604
TRID

<u>Cost Categories:</u>	<u>Contract Method & Type</u>	<u>Performing Activity & Location</u>	<u>Total Prior Yrs Cost</u>	<u>FY 1999</u>		<u>FY 2000</u>		<u>Cost to Complete</u>	<u>Total Cost</u>	<u>Target Value of Contract</u>
				<u>Cost</u>	<u>Award Date</u>	<u>Cost</u>	<u>Award Date</u>			
Miscellaneous	Various	Various	78,591	1,191	1Q/99	1,285	1Q/00	CONT.	CONT.	N/A
Development of Simulations	C/CPFF	TBD	0	0		0		5,000	5,000	5,000
Subtotal Project Development			78,591	1,191		1,285		CONT.	CONT.	
Remarks										
Miscellaneous	Various	Various	10,288	217	1Q/99	250	1Q/00	CONT.	CONT.	N/A
Subtotal Support			10,288	217		250		CONT.	CONT.	
Remarks										
Miscellaneous	Various	Various	0	685	1Q/99	100	1Q/00	CONT.	CONT.	N/A
Subtotal Test & Evaluation			0	685		100		CONT.	CONT.	
Remarks										
Subtotal Management			0	0		0		0	0	
SBIR Assessment				20					20	
Remarks										
Total Cost			88,879	2,113		1,635		CONT.	CONT.	

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204571N

PROGRAM ELEMENT TITLE: Consolidated Training Systems

PROJECT NUMBER: W1998

PROJECT TITLE: Joint Tactical Combat Training System (JTCTS)

(U) COST: (Dollars in Thousands)

Project Number & Title	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete	Total Program
W1998 Joint Tactical Combat Training System (JTCTS)	31,277	9,412*	7,871	7,933	6,048	5,115	5,244	5,363	CONT.	CONT.
TOTAL	31,277	9,412	7,871	7,933	6,048	5,115	5,244	5,363	CONT.	CONT.
Quantity of RDT&E Articles	12	0	0	1	0	7	7	0	CONT.	CONT.

* Controls reflect a \$2.5M Congressional add for LATR/KITS integration technical evaluation to be executed under project unit W2660.

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Joint Tactical Combat Training System (JTCTS) is planned to provide fixed, transportable, and mobile range instrumentation equipment for the USN and USAF for both shore-based and deployable applications. The fixed application provides shore-based tactical aircrew training while the mobile application will provide deployable at-sea single platform to multi-platform (surface ship, submarine and aircraft) and Naval Expeditionary Force multi-warfare training. To accomplish this, the JTCTS instrumentation is being designed to develop and transmit exercise scenarios; simulate/stimulate all exercise participants sensors/weapons with the exercise scenario, track all exercise participants and events, e.g., weapons engagements; and provide accurate, realistic, and timely exercise feedback. JTCTS is building on technology developed for existing Tactical Training Ranges Systems including the Tactical Aircrew Combat Training System, Mobile Sea Range, Large Area Tracking Range, and the capabilities developed for the in-port Battle Force Tactical Training Program. JTCTS incorporates the Defense Modeling and Simulation Office sponsored Distributed Interactive Simulation protocol data unit and the Higher Level Architecture for interoperability with Navy and other service live, virtual (simulators), and constructive (war games) simulations.

Based on the reduced funding profile that has occurred since the FY98 President's Budget, the JTCTS program has been restructured. The program schedule has been restructured to a more evolutionary approach which develops/fields a mobile, rangeless capability first; followed by the development/fielding of a fixed air range capability and finally the development/fielding of a fleet battle group capability. The first part of the approach additionally will meet an urgent fleet requirement for a mobile rangeless air combat capability delivered to Carrier Air Wing Five (CVW-5) in FY00. The CVW-5 requirement will be met by leaving in

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204571N

PROGRAM ELEMENT TITLE: Consolidated Training Systems

PROJECT NUMBER: W1998

PROJECT TITLE: Joint Tactical Combat Training System (JTCTS)

place the JTCTS development prototype after operational testing with CVW-5, thus providing an interim training capability to CVW-5 after fully testing the system within a robust operational environment. The mobile rangeless engineering and manufacturing development (E&MD) system consists of a "core" for mission control and debrief capability and 12 participant instrumentation packages (PIPs).

The fixed range phase will begin development in FY01 and continue into FY03. The fixed range "core" will build upon the mobile "core" resulting in a greatly enhanced version that will interface with existing training range systems such as the Integrated Air Defense system. The fixed range phase will culminate in the testing and development of the E&MD core to the Naval Strike Air Warfare Center, NAS Fallon NV. The "core" and interfaces will be supplemented by 115 PIPs procured with Aircraft Procurement Navy (APN) funding. This E&MD system will be left in place to satisfy fleet requirements to replace the aging TACTS system at NSAWC Fallon.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1998 ACCOMPLISHMENTS:

- (U) (\$26,387) Continued contract for engineering and manufacturing development (E&MD) for the mobile rangeless capability to include, software/hardware development, site/platform integration, development testing and hardware manufacturing. Supported government testing.
- (U) (\$ 4,890) Monitored contractor software development, hardware/software integration, development testing and hardware manufacturing. Began government development testing. Prepared platform site for integration development testing.

2. FY 1999 PLAN:

- (U) (\$3,115) Continue the E&MD portion of the contract for the mobile rangeless capability to include software/hardware development and contractor acceptance testing.
- (U) (\$2,707) Conduct system platform integration testing. Continue government development operational testing.
- (U) (\$1,000) Monitor contractor progress and coordinate subsystem development/test.
- (U) (\$ 96) Portion of extramural program reserved for Small Business Innovation Research Assessment in accordance with 15 USC 638.
- (U) (\$2,494) Conduct a LATR/KITS integration technical evaluation (project unit W2660).

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204571N

PROGRAM ELEMENT TITLE: Consolidated Training Systems

PROJECT NUMBER: W1998

PROJECT TITLE: Joint Tactical Combat Training System (JTCTS)

3. FY 2000 PLAN:

- (U) (\$3,900) Deliver and install mobile rangeless system on CV-63/CVW-5.
- (U) (\$3,971) Complete government development operational testing. Monitor contractor hardware/software development and hardware/software integration. Leave prototype JTCTS system in place for fleet use.

(U) B. PROGRAM CHANGE SUMMARY

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
(U) FY 1999 President's Budget:	32,365	6,942	7,910
(U) Appropriated Value:	33,967	9,442	
(U) Adjustments from President's Budget:	-1,088	+2,470	-39
(U) FY 2000 President's Budget Submit:	31,277	9,412	7,871

CHANGE SUMMARY EXPLANATION:

(U) Funding: The FY98 decrease of -\$1,088 thousand is based on a \$720 thousand reduction for Small Business Innovative Research Assessment, a \$364 thousand reduction for Navy's reprioritization of requirements and a \$4 thousand reduction for a minor pricing adjustment. The FY99 increase of \$2,470 thousand reflects a Congressional add of \$2,500 thousand for LATR/KITS integration executed under W2660. This increase is partially offset by a -\$24 thousand decrease for Congressional undistributed reductions and -\$6 thousand for minor pricing adjustments under W2660. The FY00 decrease of -\$39 thousand reflects pricing adjustments.

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204571N

PROJECT NUMBER: W1998

PROJECT TITLE: Joint Tactical Combat Training
System (JTCTS)

CHANGE SUMMARY EXPLANATION CONT.:

(U) Schedule: The following milestones have been changed due to program restructure.

From	To
MS III 1Q/02	MS III 4Q/00
SW PDR 3Q/98	SW PDR 4Q/98
SW CDR 4Q/98	SW CDR 1Q/99

The following milestone has been added:

FRP Contract Award 1Q/01

(U) Technical: Not Applicable.

(U) C. OTHER PROGRAM FUNDING SUMMARY

Appn	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete
(U) OPN/P-1 Weapons Range Support Equipment	0	0	0	0	4,400	2,900	3,906	2,898	CONT.
(U) APN/P-1 Other Production Charges	0	0	16,269	17,339	14,776	15,387	15,764	16,099	CONT.

Related RDT&E

(U) P.E.: Joint program with USAF Program Element 0604735F

(U) C. ACQUISITION STRATEGY: Due to the restructured acquisition program, we plan on maintaining a cost plus award fee (CPAF) contract for the E&MD and FOT&E efforts through each phase of JTCTS development. Final strategy is pending finalization of program restructure.

(U) D. SCHEDULE PROFILE: See attached milestone chart.

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DATE: February 1999

BUDGET ACTIVITY: 7

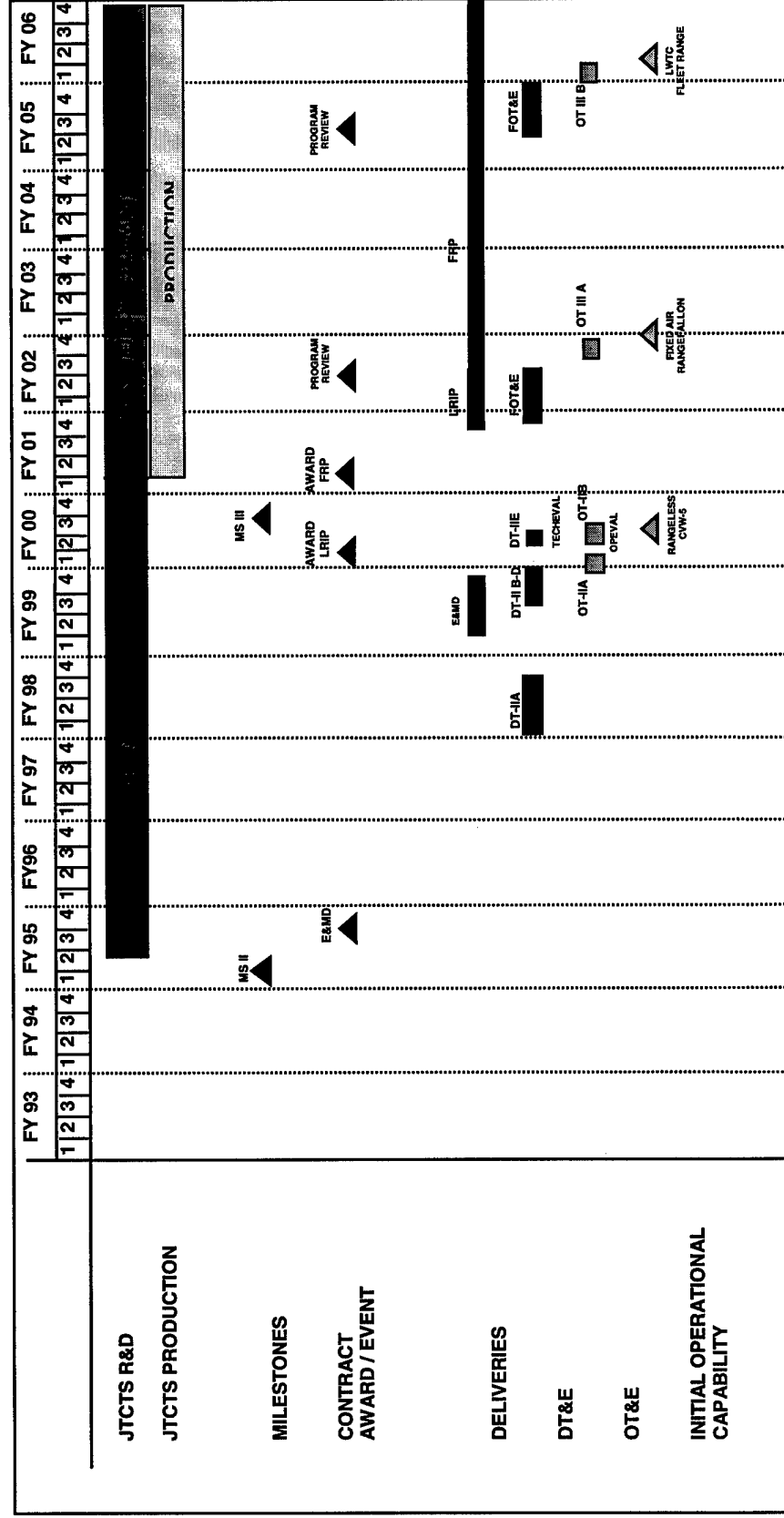
PROGRAM ELEMENT: 0204571N

PROJECT NUMBER: W1998

PROGRAM ELEMENT TITLE: Consolidated Training Systems

PROJECT TITLE: Joint Tactical Combat Training

JTCTS PROGRAM SCHEDULE



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EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204571N

PROJECT NUMBER: W1998
PROJECT TITLE: JTCTS

<u>Cost Categories:</u>	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999		FY 2000		Cost to Complete	Total Cost	Target Value of Contract
				Cost	Award Date	Cost	Award Date			
Mobile Rangeless EDM Development Award Fee	CPAF	Raytheon	78,278	3,115	1Q/99	3,500	1Q/00	0	84,893	84,893
Fixed Range EDM Development Award Fee	CPAF	Raytheon	5,714	0	N/A	0	N/A	0	5,714	5,714
Miscellaneous	CPAF	Raytheon	0	0	0	0	N/A	CONT.	CONT.	CONT.
	CPAF	Raytheon	0	0	0	0	N/A	CONT.	CONT.	CONT.
	Various	Various	24,863	1,864	1Q/99	2,751	1Q/00	CONT.	CONT.	N/A
LATR/KITS Integration	TBD	TBD	0	2,494	TBD					
Subtotal Project Development			108,855	7,473		6,251		CONT.	CONT.	
Remarks										
Percent of award fee that was actually awarded in prior years is 54% (3.1M).										
Miscellaneous	Various	Various	8,290	1,000	1Q/99	484	1Q/00	CONT.	CONT.	N/A
Subtotal Support			8,290	1,000		484		CONT.	CONT.	
Remarks										
Miscellaneous	WX	NAWC AD PAX	1,361	843	1Q/99	1,136	1Q/00	CONT.	CONT.	N/A
Subtotal Test & Evaluation			1,361	843		1,136		CONT.	CONT.	
Remarks										
Subtotal Management			0	0		0		0	0	
SBIR Assessment				96					96	
Remarks										
Total Cost			118,506	9,412		7,871		CONT.	CONT.	

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0204571N PROJECT NUMBER: W2124
 PROGRAM ELEMENT TITLE: Consolidated Training Systems PROJECT TITLE: Air Warfare Training Development
 Development

(U) COST: (Dollars in Thousands)

<u>Project Number & Title</u>	<u>FY 1998 Budget</u>	<u>FY 1999 Budget</u>	<u>FY 2000 Estimate</u>	<u>FY 2001 Estimate</u>	<u>FY 2002 Estimate</u>	<u>FY 2003 Estimate</u>	<u>FY 2004 Estimate</u>	<u>FY 2005 Estimate</u>	<u>To Complete</u>	<u>Total Program</u>
W2124 Air Warfare Training Development 1,719		1,847	2,131	2,192	1,961	2,189	2,246	2,298	CONT.	CONT.
TOTAL	1,719	1,847	2,131	2,192	1,961	2,189	2,246	2,298	CONT.	CONT.

Quantity of RDT&E Articles

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

This project develops new training system technologies for use in naval aviation training. Products from this effort directly support the Marine Corps Aviation Simulation Master Plan and will support the development and design of future naval aviation training/mission rehearsal systems. Tasks include: 1) Advanced training systems development to provide for transportable, modular, High Level Architecture (HLA) compliant, high fidelity mission rehearsal capabilities. Mission rehearsal is defined as the practice of planned tasks and functions critical to mission success using a true-to-life, interactive representation of the expected operating environment. Technologies to be developed and integrated include helmet mounted and/or flat panel displays, photographic quality image generation, advanced environmental effects models, radar/infra-red/electro-optic and acoustic sensor simulations; and 2) the Aviation Training Technology Integration Facility (ATTIF) which is a man-in-the-loop testbed for the integration of software, hardware, and networked systems. ATTIF will include a HLA node for participation in fleet exercise synthetic battlespace. This ATTIF capability provides a window to fleet aviators for critical comment, evaluation, and fine tuning of new and innovative technology before it is fielded.

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204571N

PROGRAM ELEMENT TITLE: Consolidated Training Systems
Development

PROJECT NUMBER: W2124

PROJECT TITLE: Air Warfare Training Development

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1998 ACCOMPLISHMENTS:

- (U) (\$384) Developed initial performance level specification for Mission Rehearsal image generators.
- (U) (\$568) Determined core sensor, environmental, and threat modeling performance level specifications.
- (U) (\$215) Achieved preliminary integration of display, image generator, and effects modeling systems (ATTIF).
- (U) (\$552) Increased operational capability of ATTIF for networking/HLA test node.

2. FY 1999 PLAN:

- (U) (\$525) Develop Image Generator performance specifications for rehearsal, training, and networkable PCs.
- (U) (\$320) Develop baseline night vision device (NVD) simulation performance specifications.
- (U) (\$886) Reach IOC for ATTIF networkable, reconfigurable mission rehearsal device.
- (U) (\$110) Determine specification-level database attributes for IR, environmental, and special effects modeling.
- (U) (\$) 6) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. FY 2000 PLAN:

- (U) (\$505) Develop NVD simulation performance specifications for legacy systems integration.
- (U) (\$282) Demonstrate/evaluate combat special effects modeling (ATTIF).
- (U) (\$120) Develop draft performance specifications for combat special effects modeling.
- (U) (\$624) Demonstrate low-cost, networkable, PC-based IGS with photo-realistic databases (ATTIF).
- (U) (\$600) Develop initial performance specifications for modular weapons systems simulation.

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204571N

PROJECT NUMBER: W2124

PROGRAM ELEMENT TITLE: Consolidated Training Systems Development
PROJECT TITLE: Air Warfare Training Development

(U) B. PROGRAM CHANGE SUMMARY

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
(U) FY 1999 President's Budget:	1,972	2,053	2,167
(U) Appropriated Value:	2,106	2,053	
(U) Adjustments from President's Budget:	-253	-206	-36
(U) FY 2000 President's Budget Submit:	1,719	1,847	2,131

CHANGE SUMMARY EXPLANATION:

(U) Funding: The FY98 adjustment of -\$253 thousand reflects a reprogramming of \$222 thousand for other Navy priorities and a Small Business Innovative Research (SBIR) assessment of -\$31 thousand. The FY99 adjustment of -\$206 thousand reflects Congressional undistributed reductions. The FY00 adjustment of -\$36 thousand reflects minor pricing adjustments.

(U) Schedule: N/A

(U) Technical: N/A

(U) C. OTHER PROGRAM FUNDING SUMMARY (Dollars in Thousands)

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>To</u>
	<u>Budget</u>	<u>Budget</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Complete</u>
Appn APN Line 51									
COMMON GROUND EQUIPMENT	0	0	31,373	10,592	42,871	22,784	10,264	0	117,184
(USMC Aviation Simulation Master Plan)									

Related RDT&E

(U) P.E. 0603707N, Project # R1773, Sub-Project Title: Transportable Strike Assault Rehearsal System (T-STARS)

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204571N

PROGRAM ELEMENT TITLE: Consolidated Training Systems
Development

PROJECT NUMBER: W2124

PROJECT TITLE: Air Warfare Training Development

(U) D. ACQUISITION STRATEGY:

This is a non-acquisition program with no specific acquisition strategies.

(U) E. SCHEDULE PROFILE

(U) Program Milestones

FY 1998

FY 1999

FY 2000

(U) Engineering Milestones

4Q Perf Spec
Sensors & FOV

3Q PC IG
Sensor Sim

2Q PC IG
Perf Spec

(U) T&E Milestones

4Q Prelim ATTIF
capability

4Q IOC ATTIF
network
PC IG demo

3Q PC IG
photo-realistic Db

() Contract Milestones

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EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204571N

PROJECT NUMBER: W2124

PROJECT TITLE: Air Warfare Training Development

<u>Cost Categories:</u>	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999		FY 2000		Cost to Complete	Total Cost	Target Value of Contract
				Cost	Award Date	Cost	Award Date			

MIPR/WX	Miscellaneous	7186	895	11/98	1259	11/99	CONT.	CONT.	CONT.	
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Subtotal Product Development

7,186	895	1,259	CONT.	CONT.	CONT.
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Remarks:

RC	GenPhysics Fairfax, VA	749	100	11/98	110	11/99	CONT.	CONT.	CONT.	
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Subtotal Support

749	100	110	CONT.	CONT.	CONT.
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Remarks:

WX	Misc/ATTIF	1,154	815	11/98	731	11/99	CONT	CONT	CONT	
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Subtotal Test & Evaluation

1,154	815	731	CONT	CONT	CONT
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Remarks:

WX	NAWC-AD	710	31	11/98	31	11/99	CONT	CONT	CONT	
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Subtotal Management

710	31	31	CONT	CONT	CONT
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Remarks:

SBIR Assessment

6	1,847	2,131	CONT	CONT	CONT
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Total Cost

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204571N

PROJECT NUMBER: X1823

PROGRAM ELEMENT TITLE: Consolidated Training Systems Development
Gaming Systems (ENWGS), Training, Modeling

PROJECT TITLE: Enhanced Naval Warfare,

Systems (TMS)

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1998 ACTUAL	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X1823 Training and Training Devices Systems (TTDS)										
*	840	0	0	0	0	0	0	0	0	13,619
X1823 Training and Modeling Systems (TMS)										
	0	9,989	8,209	10,565	9,063	8,601	7,437	7,610		61,474

A (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The employment of naval forces in a multi-dimensional warfare environment is a complex operational problem. To counter the threat expected in hostile environments, naval officer training must be provided for all mission areas on a real-time basis at the Battle Force/Group level. This training must focus on tactical decision-making, tactics development/evaluation, and operational planning/execution. Shore-based classroom training and at-sea exercises have historically satisfied the Battle Group tactical training requirement. However, the effectiveness of this approach to training was reduced by the lack of a real-time decision-making environment during shore-based training and the reduction in number and scope of at-sea exercises. Training and Training Devices Systems is fulfilled by the Enhanced Naval Warfare Gaming System (ENWGS). Training and Modeling Systems is fulfilled by the Joint Simulation System (JSIMS), which will replace ENWGS.

ENWGS, with development ending in FY98, is a legacy modeling system for Navy Tier II and III training. It is in catastrophic maintenance mode pending replacement by JSIMS provides the decision-making environment and is a critical portion of the training that Battle Group Commanders and their supporting Warfare Commanders receive prior to deployment. ENWGS provides development of an enhanced wargaming/simulation capability to provide training to Battle Group Commanders and associated Warfare Commanders. ENWGS is a geographically distributed wargaming system that supports the needs and objectives of the Fleet Commanders. Through computer simulation, ENWGS assists tactical commanders in planning, executing, and evaluating Fleet operations and exercises. ENWGS also provides the ability to test the Battle Groups Operation Orders, providing the essential supplement to at-sea operations, prior to deployment. During FYs 95-98, ENWGS completed its conversion to an open systems architecture to provide software portability (Release 5.0).

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Exhibit R-2a, RDT&E Budget Project Justification
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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204571N

PROGRAM ELEMENT TITLE: Consolidated Training Systems Development
Gaming Systems (ENWGS), Training, Modeling

PROJECT NUMBER: X1823

PROJECT TITLE: Enhanced Naval Warfare,

Systems (TMS)

* This amount include FY-94 - FY-98.

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Joint Simulation System (JSIMS) will replace ENWGS and provide expanded functionality. The mission of JSIMS is to provide a readily available, operationally valid synthetic environment for the Commanders-in-Chief (CINCs), their components, other Joint organizations and the Services to: jointly train, educate, develop doctrine and tactics, formulate and assess operational plans, assess warfighting situations, define operational requirements, and provide operational inputs to the acquisition process. In short, JSIMS will provide not only an improved certified capability for inter-Service operability but also an enhanced Joint Battle Staff training capability for the warfighting CINCs. All service Executive Agents (EAs) and Development Agents (DAs) are required to contribute to the initial population of the JSIMS architecture with facilities, services and tools, to meet an Initial Operational Capability (IOC) for Joint Task Force (JTF) training of no later than April 2001, and of Full Operational Capability (FOC) for all service applications no later than 2003. In keeping with the premise that the Services/components are best able to define their own capabilities and functionality, the JPO is working in concert with the Services to import Service-provided functionality such as land, air, naval and littoral warfare to JSIMS. The JPO will integrate these functionalities for use by Joint Army/Marine/Navy/Air Force exercise. JSIMS development is incremental. In June 1994 the Services and Director Joint Program Office signed a Memorandum Of Agreement (MOA) to establish JSIMS; a critical next-generation Modeling and Simulation (M&S) system. The long term goal of the agreement is to integrate the range of missions of the Armed Forces within a common framework. That framework provides a balanced melding of live, virtual and constructive M&S representations, with Command, Control, Communications, Computers and Intelligence (C4I) fully supported, and interfaces using real-world equipment. As the Maritime Warfare EA, OPNAV N7, on 29 Aug 1995, assigned NAVSEA as the JSIMS Maritime Development Agent (DA). The objective of the JSIMS Maritime portion of the JSIMS Program is to train at all levels of command, in all warfare areas, including joint and service specific training. JSIMS Maritime is developing the Maritime Mission Space Objects for the JSIMS Program, as well as selected portions of the core infrastructure and services to be determined when the Joint Object Model is partitioned. PROGRAM WAS TRANSITIONED FROM NAVSEA TO SPAWAR IN FY99.

1. (U) FY 1998 ACCOMPLISHMENTS:

- (\$840) ENWGS completed and fielded R5.0 Build 2 (TAC-4 Workstation Game Play and Game Preparation). Completed and fielded R5.0, Build 3 (Operational Interface Design (Link 11, OTH-Gold and Post Game Analysis).

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Exhibit R-2a, RDT&E Budget Project Justification
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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204571N

PROJECT NUMBER: X1823

PROGRAM ELEMENT TITLE: Consolidated Training Systems Development
Gaming Systems (ENWGS), Training, Modeling

PROJECT TITLE: Enhanced Naval Warfare,

Systems (TMS)

2. (U) FY 1999 PLAN:

- (\$8134) - Complete Build N1 Engineering & Development and T&E; complete Build N2 Engineering & Development. Build N3: Continue work on Domain Design, Domain Analysis, and Software Construction; initiate Database Development and Integration and Test. Initiate Version 1.1 Development.
- (\$1855) - Model/software development required to support Joint Training Federation (JTF) HQ Staff training for electro-optic sensors, Combat DF/OUTBOARD, acoustic comms, countermeasures, tactical control devices, Command and Control Warfare, littoral representation, strike warfare ops, Theater Missile Defense Command and Control, amphibious logistics, in-port replenishment, and logistics operations.

3. (U) FY 2000 PLAN:

- (\$8209) - Complete Build N1, which includes all the models and functionality required to fully meet the JSIMS ORD for IOC and conduct demonstration of functionality. Database Development, Software Construction, and Integration and Test. Continue work on Version 1.1 Development. Initiate Version 1.0 Development and Version 1.2 Development. Complete Build N1, which includes all the models and functionality required to fully meet the JSIMS-M ORD for IOC and conduct demonstration of functionality.

- B. (U) PROGRAM CHANGE SUMMARY:** FY-98 was decreased (-\$22K) for SBIR reduction and (-\$10K) for DD1002: April 1998 Update. Net decrease of (-\$32K). FY-99 : Baseline Issue (+\$8,167M); Additional JSIMS Development (BTR) (+\$1,855M); Sec. 8108 Revised Economic Assumptions (-\$19K); Civilian Personnel Underexecution (-\$14K)

C. (U) OTHER PROGRAM FUNDING SUMMARY; (Dollars in thousands)

	FY98	FY99	FY2000
OPN (TMS)		0	1,011
O&MN (TMS)		0	236
OPN (TTDS)	911	1,036	0
O&MN (TTDS)	1669	1,872	1,889

D. (U) SCHEDULE PROFILE: Not Applicable

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FY 2000 President's Budget Estimate

Exhibit R-3 Cost Analysis	Date: February 1999
APPROPRIATION/BUDGET ACTIVITY	PROJECT NAME AND NUMBER
RDTE/BA 7	Training & Modeling Systems (TMS) X1823
	Consolidated Training Systems Development - 0204571N

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total Pys Cost	FY99 Award Cost	FY99 Award Date	FY00 Award Cost	FY00 Award Date	FY01 Cost	FY01 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development												
Ancillary Hardware Development												
Systems Engineering	WR/RCP	Various	2,035	1,225	11/98	1,205	TBD			CONT	CONT	N/A
Licenses	WR/RCP	SSCSD, CA		408	11/98	412	TBD			CONT	CONT	N/A
Tooling												
GFE												
Award Fees												
Subtotal Product Development			2,035	1,633		1,617				CONT	CONT	N/A

Remarks:

* PY Total also includes Multiple Contractors under Performing Activity

Development Support Equipment												
Software Development	WR/RCP	SSCSD, CA	9,964	2,965	11/98	2,108	TBD			CONT	CONT	N/A
Training Development												
Integrated Logistics Support												
Configuration Management												
Technical Data	WR/RCP	SSCSD, CA*		2,543	11/98	1,636	TBD			CONT	CONT	N/A
GFE												
Subtotal Support			9,964	5,508		3,744				CONT	CONT	N/A

Remarks:

*PY includes Multiple Contractor under Performing Activity

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FY 2000 President's Budget Estimate

Exhibit R-3 Cost Analysis	Date: February 1999
APPROPRIATION/BUDGET ACTIVITY	PROJECT NAME AND NUMBER
RDTE/BA 7	Training & Modeling Systems (TMS) X1823
	PROGRAM ELEMENT NAME AND NUMBER
	Consolidated Training Systems Development - 0204571N

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Cost	FY99 Award Date	FY00 Award Date	FY01 Cost	FY01 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	WR/RCP	Various	1,620	408	11/98	412	TBD		CONT	CONT	N/A
Operational Test & Evaluation											
Tooling											
GFE											
Subtotal T&E			1,620	408		412			CONT	CONT	N/A

Remarks:

*PY includes NSWC PHD under Performing Activity

Contractor Engineering Support	WR/RCP	SSCSD, CA*		1,111	11/98	1,161	TBD		CONT	CONT	N/A
Government Engineering Support	WR/RCP	SSCSD, CA		1,214	11/98	1,154	TBD		CONT	CONT	N/A
Program Management Support											
Program Management Personnel											
Travel	WR/RCP	SSCSD, CA		115	11/98	121	TBD		CONT	CONT	N/A
Labor (Research Personnel)											
Overhead											
Subtotal Management				2,440		2,436			CONT	CONT	N/A

Remarks:

* PY includes Multiple Contractors under Performing Activity

Total Cost			13,619	9,989		8,209			CONT	CONT	N/A
Remarks:											

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Exhibit R-2, RDT&E Budget Item Justification										Date FEB 99
APPROPRIATION/BUDGET ACTIVITY : RDT&E/N BA-7										R-1 ITEM NOMENCLATURE : INFORMATION WARFARE 0204575N
COST (\$ in Millions)	FY 98	FY 99	FY 00	FY 01	FY 02	FY 03	FY 04	FY 05	Cost to Complete	Total Cost
Total PE Cost	1.574	3.707	3.494	3.789	3.838	3.903	3.984	4.242	CONT.	CONT.
Project Z2263	1.574	3.707	3.494	3.789	3.838	3.903	3.984	4.242	CONT.	CONT.
Quantity of RDT&E Articles										
A. Mission Description and Budget Item Justification :										
The Naval Information Warfare Activity is tasked as the Navy's principal technical agent to research, assess, develop and prototype Information Warfare (IW) capabilities.										
B. Program Change Summary: Funding for FY00 through FY03 adjustments are a result of a new technology development program requirement.										

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Exhibit R-2, RDT&E Project Justification
(Exhibit R-2, Page 1 of 5)

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Exhibit R-2a, RDT&E Project Justification										Date: FEB 99
RDT&E-N BA-7	0204575N					INFORMATION WARFARE Z2263				
Cost (\$ in Millions)	FY 98	FY 99	FY 00	FY 01	FY 02	FY 03	FY 04	FY 05	Cost to Complete	Total Cost
Project Cost	1.574	3.707	3.494	3.789	3.838	3.903	3.984	4.242	CONT.	CONT.
RDT&E Articles Qty	VAR	TBD	TBD	TBD	TBD	TBD	TBD	TBD	CONT.	CONT.
A. Mission Description and Budget Item Justification										
<p>This program supports the development of an effort encompassing all aspects of IW attack, protect and exploit. A key focus of efforts in this line will be providing tactical commanders with an IW Mission Planning, Analysis, and Command and Control Targeting System (IMPACTS) tool. An aggressive program is maintained to acquire and analyze state-of-the-art technologies (software and hardware). Evaluate fleet applicability and prototype developmental capabilities. FY99 will initiate the design of next generation tactical deception (TD) systems as well as design the next generation psychological operations (PSYOP) system. These will continue through FY 01. FY 01 will initiate design to modify and incorporate second generation jammer. The project will continue upgrades through out-years. Ongoing efforts are to identify and develop new IW tools.</p>										
B. Other Program Funding Summary										
	<u>FY98</u>	<u>FY99</u>	<u>FY00</u>	<u>FY01</u>	<u>FY02</u>	<u>FY03</u>	<u>FY04</u>	<u>FY05</u>	To	Total
MPN Line 1B1B	11.3	11.1	11.8	12.1	12.5	12.8	12.9	12.9		CONT.
CONT.										
OMN Line 4B7N	1.7	1.8	1.9	1.9	2.0	2.0	2.0	2.1		CONT.
CONT.										
OPN 23400/6	3.6	4.3	4.3	4.4	4.3	4.8	5.9	6.1		CONT.
CONT.										
RPN Line 1C1C	0.8	0.8	0.8	0.8	0.8	0.9	1.0	1.0		CONT.
CONT.										
C. Acquisition Strategy: This is a non-A-CAT program. No acquisition strategy exists.										

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Exhibit R-2, RDT&E Project Justification
(Exhibit R-2, Page 2 of 5)

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Exhibit R-2a, RDT&E Project Justification	Date: FEB 99
D. Schedule Profile: N/A	

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Exhibit R-3 Cost Analysis (page 1)												Date: FEB 99	
APPROPRIATION/BUDGET ACTIVITY RDT&E/N/BA-7				PROGRAM ELEMENT 0204575N				INFORMATION WARFARE					
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY's Cost	FY99 Award Date	FY99 Cost	FY00 Award Date	FY00 Cost	FY01 Award Date	Cost To Complete	Total Cost	Target Value of Contract		
Software Development	CPFF	Various	2.921	2/00	3.601	2/01	3.394		Cont.	Cont.	Cont.		
Support Cost	WR	Various	0.240	2/00	0.106	2/01	0.100		Cont.	Cont.	Cont.		
Subtotal Development		Various	3.161	2/00	3.707	2/01	3.494		Cont.	Cont.	Cont.		
Remarks: Information Warfare is defined as "actions taken to achieve information superiority by affecting adversary information, information-based processes, information systems, and computer-based networks while defending one's own information, information-based processes, information systems, and computer-based networks." The Information Warfare (IW) System Program funds several capabilities enabling joint and fleet commanders to conducts IW. It mans, trains, and equips naval forces to conduct IW.													
Due to the rapidly developing pace of technology (turns over every 18 months) and emerging threat countries/entities, the IW program must be adaptable to ever changing requirements for capabilities.													

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Exhibit R-3 Cost Analysis (page 2)												Date: FEB 99	
APPROPRIATION/BUDGET ACTIVITY				PROGRAM ELEMENT				PROJECT NAME AND NUMBER					
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	CY Cost	CY Award Date	BY1 Cost	BY1 Award Date	BY2 Cost	BY2 Award Date	Cost To Complete	Total Cost	Target Value of Contract	
Developmental Test & Evaluation													
Operational Test & Evaluation													
Tooling													
GFE													
Subtotal T&E													
Remarks													
Contractor Engineering Support													
Government Engineering Support													
Program Management Support													
Program Management Personnel													
Travel													
Labor (Research Personnel)													
Overhead													
Subtotal Management													
Remarks													
Total Cost			3.161	3.707	2/00	3.494	2/01			Cont.	Cont.	Cont.	
Remarks													

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(Exhibit R-3, Page 5 of 5)

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EXHIBIT R-2, FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205601N

PROGRAM ELEMENT TITLE: HARM Improvement

(U) COST: (Dollars in Thousands)

<u>Project Number & Title</u>	<u>FY 1998 Budget</u>	<u>FY 1999 Budget</u>	<u>FY 2000 Estimate</u>	<u>FY 2001 Estimate</u>	<u>FY 2002 Estimate</u>	<u>FY 2003 Estimate</u>	<u>FY 2004 Estimate</u>	<u>FY 2005 Estimate</u>	<u>To Complete</u>	<u>Total Program</u>
E1780 HARM Improvement	4,893	7,148	11,323	9,577	5,205	4,054	2,177	2,265	0	52,038
E2185 Advanced Anti-Radiation Guided Missile (AARGM)	32,813	22,428*	10,843	7,873	0	0	0	0	0	106,596**
E2211 Joint Advanced Weapons System (JAWS) (Army Lead)	934	956	1,476	2,950	3,937	3,923	3,930	3,927	0	22,033
TOTAL	38,640	30,532	23,642	20,400	9,142	7,977	6,107	6,192	0	180,667

*FY99 estimate reflects a \$12.0M Congressional Add for AARGM(W2661/E2661).

**Funding prior to FY97 for this project is under PE 0603217N. E1780, E2185,E2211 were previously executed under W1780, W2185, W2211 respectively.

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

(U) E1780/HIGH-SPEED ANTI-RADIATION (HARM) IMPROVEMENT: The HARM Improvement Program consists of two improvement efforts: a tactical software upgrade (Block V) to the missile, and the International HARM Upgrade Program (Block VI). Block VI is a tri-national cooperative program consisting of a tactical software upgrade in conjunction with a hardware upgrade which includes the installation of an Inertial Measurement Unit (IMU) closely coupled with a Global Positioning System (GPS) receiver. This will provide a much improved guidance capability for the current AGM-88B missile (in German and Italian inventories) and AGM-88C missile (in U.S. inventory). This IMU/GPS system will be retrofitted into existing missiles, as a kit, at the depot.

(U) E2185/ADVANCED ANTI-RADIATION GUIDED MISSILE (AARGM) and W2166/AARGM (Congressional Add): AARGM is a Phase III Small Business Innovative Research (SBIR) program designed to demonstrate an advanced dual-mode seeker on an existing High speed Anti-Radiation Missile (HARM) airframe. Project Unit W2166 is used to track congressional adds to the program.

(U) E2211/JOINT ADVANCED WEAPONS SYSTEM (JAWS): JAWS is a proposed joint service program which will fulfill Army and Marine Corps Mission Needs Statement requirements for the program. The Navy is participating with the Army in joint trade studies and development of Milestone 0 support documentation including a FY 2000 new start decision and joint Analysis of Alternatives (AOA).

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**Exhibit R-2, RDT&E Budget Item Justification
(Exhibit R-2, Page 1 of 22)**

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EXHIBIT R-2, FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205601N

PROGRAM ELEMENT TITLE: HARM Improvement

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it encompasses engineering and manufacturing development for upgrade of existing, operational systems.

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205601N

PROJECT NUMBER: E1780

PROGRAM ELEMENT TITLE: HARM Improvement

PROJECT TITLE: HARM Improvement

(U) COST: (Dollars in Thousands)

<u>Project Number & Title</u>	<u>FY 1998 Budget</u>	<u>FY 1999 Budget</u>	<u>FY 2000 Estimate</u>	<u>FY 2001 Estimate</u>	<u>FY 2002 Estimate</u>	<u>FY 2003 Estimate</u>	<u>FY 2004 Estimate</u>	<u>FY 2005 Estimate</u>	<u>To Complete</u>	<u>Total Program</u>
E1780 HARM Improvement *	4,893	7,148	11,323	9,577	5,205	4,054	2,177	2,265	0	52,038
TOTAL	4,893	7,148	11,323	9,577	5,205	4,054	2,177	2,265	0	52,038

Quantity of RDT&E Articles: N/A

* Project Unit W1780 changed to Project Unit E1780 to reflect proper major claimant.

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

The High-speed Anti-Radiation Missile (HARM) is a joint service program with the Air Force (NAVY lead). The program has been in full production since FY 1983. Program Element 0205601N was used until FY 1990 to develop and test one hardware and two software upgrades to the HARM as Engineering Change Proposals (ECPs). Another ECP software program (Block V) is under development that modifies HARM software in order to meet expanding requirements. This joint service upgrade is being developed with Air Force funds under Raytheon TI Systems, Inc. contract N0001993G0179. The Air Force funds cover all contractor development and contractor Test and Evaluation (T&E) cost. The Navy funds cover all government costs related to development and T&E. The tactical software upgrade will give HARM a Home-On-Jam (HOJ) capability, improved geographic specificity, and improved capability against advanced waveforms. Studies to address corrective actions for documented deficiencies will be conducted.

The Block VI HARM Upgrade Program is a tri-national (U.S., Italy, and Germany) cooperative program designed to improve the HARM's effectiveness by enhancing the missile's probability of kill and reducing the potential for fratricide while making the missile easier to employ. The Program consists of significant hardware and software modifications to the missile's control and guidance sections. The three nations involved have agreed to jointly fund the design, development, testing and production of hardware kits to be installed in the missile control section along with an improved software version to be installed in the missile guidance section.

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205601N

PROJECT NUMBER: E1780

PROGRAM ELEMENT TITLE: HARM Improvement

PROJECT TITLE: HARM Improvements

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1998 ACCOMPLISHMENTS:

- (U) (\$1,832) Began execution of the joint service combined Development Test/Operations Test (DT/OT) program for the Block V upgrade at the Naval Air Warfare Center - Weapons Division (NAWC-WD), China Lake. Continued government development of Electronic Intelligence (ELINT), Tactical Aircraft Mission Planning System (TAMPS), and avionics update required for the Block V Upgrade.
- (U) (\$683) Developed capability to verify and test missiles while installing software developed under Block IIIA/V program.
- (U) (\$153) Continued weapons system upgrade studies assessing weapon service life, missile performance, deficiencies, and logistics requirements.
- (U) (\$862) Initiated Engineering and Project Management Services in support of the HARM Upgrade Program (Block VI). Contract will require incremental funding from all three co-development partners (U.S. Navy, Italy, and Germany) from FY 1998-2002.
- (U) (\$403) Initiated Government engineering support including system performance definition, specification requirements and design analysis for the International HARM Upgrade Program (Block VI).
- (U) (\$240) Initiated Contractor engineering support including system performance definition, specification requirements and design analysis for the International HARM Upgrade Program (Block VI).
- (U) (\$24) Initiated Government test planning, including development of the Test and Evaluation Master Plan and DT/OT test plans for Block VI.
- (U) (\$696) Initiated Government participation in defining HARM Upgrade Program (Block VI) aircraft integration requirements, including the HARM Mission Planning Module modifications for TAMPS; software requirements for the HARM Command Launch Computer (CLC); as well as the initial development of the interface control documents and support for the F/A-18 Operational Flight Program (OFP).

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 205601N

PROGRAM ELEMENT TITLE: HARM Improvement

PROJECT NUMBER: E1780

PROJECT TITLE: HARM Improvements

2. FY 1999 PLAN:

- (U) (\$1,842) Complete the NAWCWD China Lake Block V joint service support of the combined DT/OT program. Complete government development of ELINT, TAMPs, and avionics updates required for the Block V Upgrade. Conduct the Functional Configuration Audit/Physical Configuration Audit and development of the Engineering Change Proposal to incorporate the Block V software into the HARM inventory.
- (U) (\$199) Provide HARM Block V system engineering support of development and systems integration efforts. Continue weapon system upgrade studies assessing weapons service life, missile performance, deficiencies, and logistics requirements.
- (U) (\$1,009) Provide logistic support by Government personnel of Block V Software Upgrade to HARM missiles at field sites.
- (U) (\$500) Initiate Contractor development of Block VI USN unique software subroutines.
- (U) (\$723) Continue Engineering and Project Management Services in support of the HARM Upgrade Program (Block VI) contract.
- (U) (\$561) Continue Government engineering support of the HARM Upgrade Program (Block VI) including preparation for a Preliminary Design Review; support for the Interface Control Working group in defining interface requirements; supporting contractor sub-system design, analysis and testing.
- (U) (\$370) Continue Government support of contractor testing including evaluation of test plans, reports, and preparation of detailed test planning documentation.
- (U) (\$208) Initiate Government logistic support including logistics support analyses and evaluating contractor designs for Block VI.
- (U) (\$1,708) Continue Government and contractor participation in developing the aircraft avionics updates required by the HARM Upgrade Program (Block VI) in addition to CLC/TAMPs upgrade efforts and ELINT development.
- (U) (\$28) Portion of the extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205601N

PROJECT NUMBER: E1780

PROGRAM ELEMENT TITLE: HARM Improvement

PROJECT TITLE: HARM Improvements

3. FY 2000 PLAN:

- (U) (\$1,230) Continue design/development of Inertial Measurement sub-systems and development of hardware and software associated with Block VI.
- (U) (\$500) Continue development of Block VI USN unique software sub-routines.
- (U) (\$1,395) Continue Engineering and Project Management Services in support of the HARM Upgrade Program (Block VI) contract.
- (U) (\$1,920) Continue Government engineering support of the HARM Upgrade Program (Block VI) including preparation for Critical Design Review of Block VI software/hardware design. Effort includes further engineering studies, threat analysis, 6 Degrees of Freedom (DOF) analysis, documentation analysis, interface definition, precision navigation engineering, and software quality evaluation.
- (U) (\$1,640) Continue Government support of contractor testing including evaluation of test plans, reports, and preparation of detailed test planning documentation, and captive flight testing.
- (U) (\$620) Continue Government logistic support including logistics support analyses, maintenance engineering, support equipment engineering, and evaluating contractor designs.
- (U) (\$4,018) Continue Government and contractor participation in integration efforts. Continue developing the aircraft avionics updates required by the HARM Upgrade Program (Block VI) in addition to Command Launch Computer (CLC)/TAMPS upgrade efforts and ELINT development. Develop HARM TAMPS/Mission Planning Module (MPM) rehost.

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205601N

PROJECT NUMBER: E1780

PROGRAM ELEMENT TITLE: HARM Improvement

PROJECT TITLE: HARM Improvements

(U) B. PROGRAM CHANGE SUMMARY

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
(U) FY 1999 President's Budget:	4,926	7,448	11,525
(U) Appropriated Value:	4,958	7,448	
(U) Adjustments from Pres Budget:	-33	-300	-202
(U) FY 2000 President's Budget Submit:	4,893	7,148	11,323

CHANGE SUMMARY EXPLANATION:

(U) Funding:

The FY 1998 decrease of \$33K is due to a TAMPS reprogramming action of +\$125K, a -\$94K SBIR assessment, a +\$1K increase due to a below threshold reprogramming action and a -\$65K decrease for a 1998 update.

The FY 1999 decrease of \$300K is due to a -\$17K civilian personnel underexecution reduction, a -\$266K assessment for contract, advisory and assistance services and a -\$17K FY1998 update.

The FY 2000 decrease of \$202K reflects a balancing adjustment of -\$19K, an inflation adjustment of -\$165K, a Working Capital Fund adjustment of -\$77K and a civilian pay rate correction of +\$59K.

(U) Schedule: No changes

(U) Technical: No changes

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205601N

PROJECT NUMBER: E1780

PROGRAM ELEMENT TITLE: HARM Improvement

PROJECT TITLE: HARM Improvements

(U) C. OTHER PROGRAM FUNDING SUMMARY

	FY 1998 <u>Budget</u>	FY 1999 <u>Budget</u>	FY 2000 <u>Estimate</u>	FY 2001 <u>Estimate</u>	FY 2002 <u>Estimate</u>	FY 2003 <u>Estimate</u>	FY 2004 <u>Estimate</u>	FY 2005 <u>Estimate</u>	To <u>Complete</u>
WPN HARM MODS	0	0	0	0	0	10,699	10,964	11,193	16,192

Related RDT&E Not Applicable

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205601N

PROGRAM ELEMENT TITLE: HARM Improvement

PROJECT NUMBER: E1780

PROJECT TITLE: HARM Improvements

(U) D. ACQUISITION STRATEGY:

The HARM Block VI Upgrade program is an ACAT III Program and will consist of three separate phases (EMD, Production, and Technology Evaluation and Assessment). The acquisition strategy for the HARM Block VI Program is complete and is based upon a signed international Memorandum of Agreement with Germany, Italy, and the U.S. Navy; a tri-national Cooperative Operational Requirements Document (CORD) details German, Italian, and U.S. Navy common requirements; and a Cooperative Test and Evaluation Master Plan (CTEMP) summarizes all test requirements. These three documents drive the overall acquisition approach to the HARM Block VI project.

Management of the Block VI upgrade will be directed by a trilateral Steering Committee, however, the U.S. Navy Project Manager (in concert with Project Managers from Germany and Italy) is responsible for Program execution. Each partner will share one-third of "common costs," the U.S. Navy will fund Block VI unique costs, and the German and Italian participants will fund Block IIIB unique costs. Each country will pay its own aircraft integration costs.

The acquisition strategy delineates Industry and Government responsibilities. The contract strategy (i.e. hardware and software for missile, upgraded missile sections, contractor team responsibility for missile performance) assigns unique work tasks to each firm. Contract strategy is to issue contracts to Bodenseewerk Geratetechnik GmbH (BGT) (German), Alenia Difesa (Italian), and Raytheon Texas Instruments Systems (RTIS) (U.S.) firms and will maximize use of commercial-off-the-shelf (COTS)/government-off-the-shelf (GOTS)/non-development items (NDI). Each Phase I (EMD) contract type and structure is tailored to the product of each firm.

(U) E. SCHEDULE PROFILE

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>To Complete</u>
(U) Program Milestones		M/S II (1Q)		
(U) Engineering Milestones		PDR (4Q)	CDR(4Q)	TRR(3Q)
(U) T&E Milestones				Combined DT/OT (3Q01 - 1Q02)
(U) Contract Milestones		RTIS, BGT & ALENIA (1Q)*		

* BGT and ALENIA Contracts are not funded with U.S. funds, but are significant milestones in the Block VI contract schedule.

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EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205601N
PE TITLE: HARM Improvement

PROJECT NUMBER: E1780
PROJECT TITLE: HARM Improvements

Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999		FY 2000		Cost to Complete	Total Cost	Target Value of	
			Cost	Award Date	Cost	Award Date			Contract	Contract
Block IIIA/V Development WX	NAWC WD, China Lake	5961	1709	Oct 98	0	0	0	7670	7670	7670
Block IIIA/V Development WX	NAWC WD, Pt. Mugu	125	0		0		0	125	125	125
Block VI Development CPIF	RTIS, Texas	0	500	Dec 98	1730	Dec 98	0	2330	2330	2330
Block VI Eng Analyses FFP	RTIS, Texas	240	0		0		0	240	240	240
Block VI Development WX	NAWC WD, China Lake	1099	2269	Oct 98	5938	Oct 99	7430	16736	16736	16736
Block VI ILS WX	NAWC WD, Point Mugu	0	208	Oct 98	620	Oct 99	2550	3378	3378	3378
Subtotal Product Development		7425	4686		8288		9980	30379	30379	30379

Remarks: NONE

Support

HARM Technical/Integration Studies

WX
NAWC WD, China Lake

110 23 Oct 98 0 277 410 410

Subtotal Support

110 23 0 277 410 410

Remarks: NONE

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EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205601N
PE Title: HARM Improvement

PROJECT NUMBER: W1780
PROJECT TITLE: HARM IMPROVEMENT

Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999		FY 2000		Cost to Complete	Target Value of Contract	
			FY 1999 Cost	Award Date	FY 2000 Cost	Award Date		Total Cost	Contract
Cost Categories:									
Test and Evaluation									
Block IIIA/V	NAWC WD, China Lake	1524	1142	Oct 98	0		0	2666	2666
Block VI	NAWC WD, China Lake	24	370	Oct 98	1640	Oct 99	8186	10220	10220
Subtotal Test & Evaluation		1548	1512		1640		8186	12886	12886
Remarks: NONE									
Management									
TRAVEL	NAWC AD, Patuxent MD	179	70	Oct 98	50	Oct 99	250	549	549
Technical Assessments/Mgmt Support	RX/LOE DCS, Alex VA	1092	829	Dec 98	1345	Dec 99	4520	7786	7786
SBIR Assessment			28					28	
Subtotal Management		1271	927		1395		4770	8363	8363
Remarks: NONE									
Total Cost		10354	7148		11323		23213	53038	52038

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205601N

PROJECT NUMBER: E2185

PROGRAM ELEMENT TITLE: HARM Improvement

PROJECT TITLE: Advanced Anti-Radiation Guided Missile(AARGM)

(U) COST: (Dollars in Thousands)

<u>Project Number & Title</u>	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>To</u>	<u>Total</u>
	<u>Budget</u>	<u>Budget</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Complete</u>	<u>Program</u>
E2185 Advanced Anti-Radiation Guided Missile (AARGM)*	32,813	22,428***	10,843	7,823	0	0	0	0	0	106,596**

* Project Unit changed from W2185 to E2185 to reflect proper major claimant

** Funding prior to FY97 for this project is under PE 0603217N

*** FY99 estimate reflects a \$12.0M Congressional add for AARGM (W2661/E2661)

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

The Advanced Anti-Radiation Guided Missile (AARGM) Project is a Phase III Small Business Innovative Research (SBIR) program to develop and demonstrate a dual-mode guidance section on a HARM airframe. The AARGM Phase III technology demonstration program is designed to demonstrate that a Dual-mode (passive Anti-Radiation Homing (ARH)/active Millimeter Wave (MMW) radar) missile can engage and destroy enemy air defenses in the event that these systems "shut-down", or employ other countermeasures.

The issue of "shut-down" has been a major shortcoming in the suppression of enemy air defenses (SEAD) element of the offensive counter air mission area for the United States Navy and Air Force. Program objectives are to demonstrate an effective and affordable lethal SEAD capability against mobile, relocatable, or fixed air defense threats even in the presence of emitter shutdown or other Anti-Radiation Missile (ARM) countermeasures. The dual-mode technology being developed in the AARGM program has very high potential to solve the problem of "shut-down" not only in the primary weapon for SEAD, the High Speed Anti-Radiation Missile (HARM), but it could be integrated with many other missile airframes.

The AARGM technology demonstration program is an outgrowth of a Phase I and II competitive SBIR program. Phase I and II SBIR efforts successfully demonstrated the feasibility of a dual-mode seeker to address radar "shut-down" issues. Science and Applied Technology (SAT), Inc. (San Diego, CA), was awarded Phase I and II contracts (FY90-93) and was subsequently selected for a Phase III demonstration in FY94. Phase III work is being performed by SAT under NAVAIR contract N00019-94-C-0078. This contractual effort will continue to be incrementally funded, under program element 0205601N, resulting in a cumulative contract value of \$108.2M.

From FY93 through FY98, the AARGM program was a Congressionally mandated program which received its funding as an annual Congressional add. Starting in FY99, AARGM will receive its program funding through the standard DoD budget appropriation process. The FY99 funds added by Congress will be used to perform risk reduction tasks in preparation for a potential Milestone II Decision in FY 2001.

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Exhibit R-3, RDT&E Project Cost Analysis
(Exhibit R-3, Page 12 of 22)

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0205601N**
PROGRAM ELEMENT TITLE: HARM Improvement

PROJECT NUMBER: E2185
PROJECT TITLE: Advanced Anti-Radiation Guided Missile(AARGM)

1. (U) FY 1998 ACCOMPLISHMENTS:

- (U) (\$31,051) Contractor integrated brassboard seekers into the SWES and CFT configurations. Commenced Control Test Vehicle (CTV) integration and test execution, prototype seeker fabrication and assembly, prototype seeker tests, and assemble and test Guided Test Vehicles (GTVs).
- (U) (\$700) Government performed technical analyses and directed project management services in support of the AARGM Advanced Technology contract.
- (U) (\$1,062) Field activity monitored the engineering activities of the AARGM Advanced Technology demonstration contractor. Conducted engineering assessments of Guidance Section Design. Provide T&E planning and engineering support to include assessment, availability and acquisition of targets, acquisition of DSM-160, and use of Advanced High Speed Anti-Radiation Missile (HARM) facility to support captive flight and live fire test programs. Provided management, technical engineering, and assembly support for the design, modification, and testing of telemetry sections in support of the AARGM CTV and GTV testing. Performed all-up-round and aircraft integration technical engineering, laboratory test support, aircraft integration, Command Launch Computer (CLC) justification, flight clearance and other activity related to AARGM field testing support. Field activity to provide analysis of alternatives based on approved weapons system scenarios to include an assessment of current Suppression of Enemy Air Defense (SEAD) deficiencies and an assessment of potential weapon system alternatives to mitigate identified deficiencies.

2. (U) FY 1999 PLAN:

- (U) (\$7,040) Contractor to develop software evaluation station, including hardware and software development, subsystems assembly and test, and seeker integration tests. Contractor to perform field tests of the AARGM brassboard seekers, prototype seeker tests, and GTV test execution.
- (U) (\$100) Government to perform technical analyses and continue technical management, engineering support, and coordination of AARGM Program weapons system technology development program.
- (U) (\$2,260) Field activity to provide AARGM system engineering support of development and systems integration efforts. Continue weapon system testing studies to assess weapons technology performance and deficiencies.
- (U) (\$800) Contractor to perform program management and engineering services in support of the AARGM technology demonstration program. Provide technical management support and coordination of AARGM Program weapons system technology studies.
- (U) (\$256) Portion of the extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: FEBRUARY 1999

**BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0205601N
PROGRAM ELEMENT TITLE: HARM Improvement**

**PROJECT NUMBER: E2185
PROJECT TITLE: Advanced Anti-Radiation Guided**

- (U) (\$9,800) Contractor to perform risk reduction activities in support of a FY 2001 potential Milestone II Decision to enter EMD. Activities will include ARH antenna array performance and affordability and producibility enhancements, MMW radar transceiver performance and affordability enhancements, EMI enhancements, radome material trade studies and advanced target discrimination algorithm development and validation.
- (U) (\$1,876) Field activity to assist in generating required documentation in support of a FY 2001 potential Milestone II Decision to EMD, including a logistics support analysis, life cycle cost analysis, draft ORD development and aircraft integration definitions. Will also provide system engineering support for prime contractor.
- (U) (\$296) Portion of the extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. (U) FY 2000 PLAN:

- (U) (\$7,600) Contractor to conduct chamber tests of the software evaluation station/brassboard. Contractor to complete unique AARGM design and commence captive flight test preparation. contractor to complete control test vehicle integration, testing, and test analysis. Contractor to finalize development of AARGM prototype, to include hardware/software design upgrades, subsystems assembly and test, prototype integration and testing, and prototype captive carry test.
- (U) (\$2,343) Field activity to provide AARGM system engineering support of development and systems integration efforts. Continue weapon system testing studies to assess weapons technology performance and deficiencies.
- (U) (\$800) Contractor to perform program management and engineering services in support of the AARGM technology demonstration program. Provide technical management support and coordination of AARGM Program weapons system technology studies.
- (U) (\$100) Continue Government technical management, engineering support, and coordination of AARGM Program weapons system technology development program.

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0205601N PROJECT NUMBER: E2185
PROGRAM ELEMENT TITLE: HARM Improvement PROJECT TITLE: Advanced Anti-Radiation Guided Missile(AARGM)

(U) B. PROGRAM CHANGE SUMMARY

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
(U) FY 1999 President's Budget:	33,962	10,480	11,000
(U) Appropriated Value:	32,813	22,480	
(U) Adjustments from Pres Budget:	-1,149	+11,948	-157
(U) FY 2000 President's Budget Submit:	32,813	22,428	10,843

CHANGE SUMMARY EXPLANATION:

(U) Funding:

The FY 1998 decrease of \$1,149K reflects a Small Business Innovative Research (SBIR) assessment.

The FY 1999 \$11,948 thousand increase reflects a decrease of \$24K for an OSD Update Adjustment, a Congressional add of \$12.0M and an economic assessment reduction of \$28K.

The FY 2000 decrease of \$157K reflects an inflation adjustment

(U) Schedule: No changes

(U) Technical: No changes

(U) C. OTHER PROGRAM FUNDING SUMMARY

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0205601N

PROGRAM ELEMENT TITLE: HARM Improvement

PROJECT NUMBER: E2185

PROJECT TITLE: Advanced Anti-Radiation Guided Missile(AARGM)

D. (U) SCHEDULE PROFILE:

The AARGM program is an Advanced Technology Program and therefore does not have a standard detailed Milestone Plan. A list of key actions appears below.

AARGM PROGRAM

FY 1998 FY 1999 FY 2000 To Complete

Software Evaluation Station/Brassboard
Hardware/Software Development
Subsystems Assembly and Test
Seeker Integration/Test
Chamber Tests

Continue
Begin 4Q/98
Begin 4Q/98
Continue
Complete 3Q/99
Complete 3Q/99
Begin 4Q/99
Complete 1Q/00

Brassboard Captive Flight Tests (CFTs)
Unique Design and CFT Preparation
Contractor Managed Testing
Captive Flight Testing

Begin 1Q/98
Continue Complete 1Q/00
1Q/00
Begin 2Q/00
Complete 3Q/01

Control Test Vehicles (CTVs)
Unique Hardware/Software Development
Subsystems Assembly and Test
Integration and Test
CTV Flights Test and Analysis

Continue Complete 4Q/99
Begin 3Q/98
Complete 3Q/99
Begin 1Q/99
Complete 2Q/00
2Q/00

Prototype

Hardware/Software Design Upgrades
Subsystems Assembly and Test
Integration and Testing
Captive Carry Test

Begin 2Q/98
Begin 4Q/98
Continue Complete 1Q/00
Complete 1Q/99
Begin 2Q/00-Complete 2Q/00
4Q/00

Guided Test Vehicles (GTVs)

Hardware/Software Design Upgrades
Subsystems Assembly and Test
Integration and Test
GTV Live Fire Test and Analysis

Begin 2Q/98
Begin 4Q/98
Continue
Continue
Continue
Continue
Complete 2Q/01
Complete 4Q/01
Begin 1Q/01-Complete 4Q/01
1Q02

Contractor design and trade studies
Milestone II Decision documentation
System engineering support

2Q/99 - 4Q/00
2Q/99 - 1Q/00
2Q/99 - 4Q/00

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EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205601N
PE Title: HARM Improvement

PROJECT NUMBER: E2185
PROJECT TITLE: Advanced Anti-Radiation Guided
Missile (AARGM)

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999		FY 2000		Cost to Complete	Total Cost	Target Value of Contract
				Cost	Date	Cost	Date			
Product Development										
AARGM Adv Technology Development	CPIF	SAT, Woodland Hills, CA	59327	7040	Jun 99	7600	Jun 00	4800	73767	78767
AARGM Engineering Support	WX	NAWC WD, China Lake	4505	2260	Oct 98	2343	Oct 99	2200	11308	11308
AARGM Engineering/Tech Assessment	CPIF	JHU/APL, MD	615	0		0		0	615	615
AARGM Risk Reduction	CPIF	SAT, Woodland Hills, CA		9800	Feb 99	0		0	9800	9800
AARGM Engineering Support	WX	NAWC WD		1876	Feb 99	0		0	1876	1876
Subtotal Product Development			64447	20976		9943		7000	102366	102366

Remarks:

Support

Subtotal Support

Remarks:

0 0 0 0 0 0 0 0 0 0 0

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EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 205601N
PE TITLE: HARM Improvement

PROJECT NUMBER: E2185
PROJECT TITLE: Advanced Anti-Radiation Guided
Missile (AARGM)

Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999		FY 1999 Award		FY 2000		Cost to Complete	Total Cost	Target Value of Contract
			Cost		Date		Date				
		0	0	0				0	0	0	0

Subtotal Test & Evaluation

Remarks:

Management

Travel

WX NAWC AD,
Pauxent MD
DCS, Alex VA

Technical Assessment/Mgmt Support

Subtotal Management

Remarks:

SBIR Assessment

Remarks:

Total Cost

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7

**PROGRAM ELEMENT: 0205601N
PROGRAM ELEMENT TITLE: HARM Improvement**

**PROJECT NUMBER: E2211
PROJECT TITLE: JAWS**

(U) COST: (Dollars in Thousands)

<u>Project Number & Title</u>	<u>FY 1998 Budget</u>	<u>FY 1999 Budget</u>	<u>FY 2000 Estimate</u>	<u>FY 2001 Estimate</u>	<u>FY 2002 Estimate</u>	<u>FY 2003 Estimate</u>	<u>FY 2004 Estimate</u>	<u>FY 2005 Estimate</u>	<u>To Complete</u>	<u>Total Program</u>
E2211 Joint Advanced Weapons Systems (JAWS) * 934		956	1,476	2,950	3,937	3,923	3,930	3,927	0	22,033
TOTAL	934	956	1,476	2,950	3,937	3,923	3,930	3,927	0	22,033

Quantity of RDT&E Articles

* Project Unit W2211 changed to Project Unit E2211 to reflect proper major claimant.

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Joint Attack Weapon System (JAWS) is a proposed joint service program which will fulfill Army and Marine Corps Mission Needs Statement requirements for the post-2000 force structure. The Army (the TOW/HELLFIRE lead service) is proposed as the lead service for the program. To support an FY 2000 new start decision, the Navy is participating with the Army in joint trade studies and development of Milestone 0 support documentation, including a joint Analysis of Alternatives (AOA). The initial basis for trade studies is improvements to the Army HELLFIRE, including alternative seekers and rocket motor improvements. Proposed TOW follow-on are being evaluated including The Army Combined Arms Weapon System (TACAWS) and Advanced Missile System - Heavy (AMS-H). The Navy is participating in the Army's Battlefield Environment Weapon System Simulation (APEX) Test Bed evaluation of the Army's Future Missile Technology Integration (FMTI) advanced developments in guidance, propulsion and warheads. Application of these developments are being assessed simultaneously with the Navy's dual mode seeker technologies in the Advanced Anti-Radiation Guided Missile (AARGM) program. The JAWS Mission Needs Statement requires a state of the art technology solution which counters air and surface threats in the post-2000 battlefield.

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0205601N**
PROGRAM ELEMENT TITLE: HARM Improvement

PROJECT NUMBER: E2211
PROJECT TITLE: JAWS

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1998 ACCOMPLISHMENTS:

- (U) (\$934) Continued APEX evaluation through introduction of fixed wing, Advanced Short Takeoff and Landing (ASTOL), and lethal/non-lethal mission requirements. Continued structuring Milestone 0 acquisition program start for FY 2000 decision. Conducted mission effectiveness simulations assessments, continued selection of technology candidates, including advanced guided rockets/Hellfire upgrades, to fulfill multi-mission requirements. Completed Flight Demo of IIR Seeker for Hellfire Missile at China Lake, CA. (\$660K Army and \$274K Government In-House)

2. FY 1999 PLAN:

- (U) (\$933) APEX Lab evaluation of fixed wing, ASTOL, lethal/non-lethal missions requirements, complete Milestone 0 documentation, complete mission effectiveness assessments, select mission technologies, transition to Pre-Planned Product Improvement or new start program. (\$450K Army and \$483K Government In-House).
- (U) (\$23) Portion of the extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. FY 2000 PLAN:

- (U) (\$1,476) Expand APEX evaluation of fixed wing, ASTOL, lethal/non-lethal missions requirements by incorporating fixed wing test bed/weapons simulator into APEX. Evaluation to include Joint Strike Fighter as Modernized Hellfire platform. Continue flight demonstrations/evaluations of advanced guided rockets/Hellfire upgrades. Prove selected technologies meet/fulfill multi-mission requirements. Continue to examine new insertions for motor, warhead, guidance, and control technologies. (\$700K Army and \$776K government in-house).

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0205601N
PROGRAM ELEMENT TITLE: HARM Improvement

PROJECT NUMBER: E2211
PROJECT TITLE: JAWS

A. PROGRAM CHANGE SUMMARY:

(U) FY 1999 President's Budget:

FY 1998	FY 1999	FY 2000
1,025	993	0

(U) Appropriated Value:

1,080 993

(U) Adjustment from Pres Budget Submit:

-91 -37 +1,476

(U) FY 2000 President's Budget Submit:

934 956 1,476

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: The FY 1998 decrease reflects a \$26K reduction for an SBIR and a \$65K reduction for below threshold reprogrammings.

The FY 1999 decrease reflects a \$37K reduction of Contractor Advisory and Assistance Services.

The FY 2000 increase of \$1,476 thousand reflects an increase of \$1,496 thousand for the expansion of the program to incorporate more studies in the APEX evaluation of fixed-wing aircraft, Advanced Short Take-Off and Landing (ASTOL), and lethal/non-lethal mission requirements and to continue effort for preparation to transition to planned product improvement (P31) or new Modernized Hellfire (HF) Program as well as -\$21K reduction for Inflation Adjustments.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

B. OTHER PROGRAM FUNDING SUMMARY: Not applicable.

RELATED RDT&E: U.S. Army P.E. 0603313A PROJ D263 Future Missile Technology Insertion (FMTI).

C. ACQUISITION STRATEGY: Not an ACAT program.

D. SCHEDULE PROFILE: Not applicable.

R-1 Item No. 162
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EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205601N
PROGRAM ELEMENT TITLE: HARM Improvement

PROJECT NUMBER: E2211
PROJECT TITLE: JAWS

<u>Cost Categories:</u>	<u>Contract Method & Type</u>	<u>Performing Activity & Location</u>	<u>Total Prior Yrs Cost</u>	<u>FY 1999 Cost</u>	<u>FY 1999 Award Date</u>	<u>FY 2000 Cost</u>	<u>FY 2000 Award Date</u>	<u>Cost to Complete</u>	<u>Total Cost</u>	<u>Target Value of Contract</u>
Product Development										
APEX	MIPR	MICOM	1761	450	NOV 98	700	NOV 00	6959	9870	9870
Subtotal Product Development			1761	450		700		6959	9870	
Support										
Engineering Technical Services	C/TMM	DCS Corp	496	215	JAN 99	300	JAN 00	2400	3411	
Subtotal Support			496	215		300		2400	3411	
Test and Evaluation										
Testing	WX	CHINA LAKE	473	241	NOV 98	456	NOV 00	7255	8425	8425
Phototelesis	MIPR	FORT EUSTIS	29						29	29
Subtotal Test & Evaluation			502	241		456		7255	8454	
Management										
Travel	WX	NAVAIR	48	27	NOV 98	20	NOV 00	180	275	275
SBIR Assessment				23					23	
Subtotal Management			48	50		20		180	298	
Total Cost			2807	956		1476		16794	22033	

R-1 Item No. 162
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FY 2000 President's Budget Estimates

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205604N

PROJECT TITLE: Tactical Data Links

(U) COST: (Dollars in Thousands)

PROJECT

NUMBER & TITLE	FY 1998 ACTUAL	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
P1743 LINK-16 Improvements										
2,469		4,421	4,207	4,212	9,665	8,550	8,734	8,922	CONT	CONT
P2126 ATDLS Integration										
38,404		44,730	42,459	18,407	13,346	17,003	17,478	19,649	CONT	CONT
TOTAL	40,873	49,151	46,666	22,619	23,011	25,553	26,212	28,571	CONT	CONT

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This program element (PE) develops and improves the Navy's tactical data link systems. It includes the LINK-16 Improvements and Advanced Tactical Data Link Systems (ATDLS) Integration programs.

(U) Link-16 Improvements extends LINK-16 technological improvements to existing and developing U.S. Navy data link systems, including LINK-11 and LINK-22. Development of the NATO Improved LINK-Eleven (NILE) project is a major element of this program. The U.S. is the lead technical nation for LINK-22 development for the NILE office. LINK-16 improvements will allow more effective employment of fleet units by increasing the timeliness, accuracy, and content of tactical data transfer.

(U) ATDLS Integration includes current efforts to develop translation tools between Tactical Digital Information Links (TADILS) and integration of the Multifunctional Information Distribution System - Low Volume Terminal (MIDS-LVT) into U.S. Navy platforms. MIDS-LVT is a multinational cooperative development program that will provide selected U.S. Navy ships and space constrained tactical fighter aircraft with LINK-16 capability through the development of a terminal that is functionally identical to the Joint Tactical Information Distribution System (JTIDS) Class II terminal, but, through the use of Very High Speed Integrated Circuit (VHSIC) and Microwave Monolithic Integrated Circuits (MMIC) technology, is one-half the weight and one-third the size of the JTIDS terminal.

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FY 2000 President's Budget Estimates

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205604N

PROJECT TITLE: Tactical Data Links

(U) Translation between TADILs will isolate all tactical data link equipment, message standards and protocols from tactical information processors. This will provide a flexible capability for rapidly exchanging tactical information using a single data base for translating various link formats while remaining completely independent of communications equipment and tactical data computing systems. ATDLS will also improve existing computer-to-computer, digital radio communications in the HF and UHF radio frequency bands among Combat Direction System (CDS) equipped ships, submarines, aircraft and shore sites.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it encompasses engineering and manufacturing development for upgrade of existing, operational systems.

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FY 2000 President's Budget Estimates

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205604N

PROJECT NUMBER: P1743

PROGRAM ELEMENT TITLE: Tactical Data Links

PROJECT TITLE: Link-16 Improvements

(U) COST (Dollars in Thousands)

PROJECT

NUMBER & TITLE	FY 1998 ACTUAL	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
P1743 LINK-16 Improvements	2,469	4,421	4,207	4,212	9,665	8,550	8,734	8,922	CONT	CONT

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This program includes the LINK-22 program and near term improvements to sustain existing LINK-11 systems. Near term LINK-11 improvements include: Mobile Universal Link Translator System (MULTS) upgrade, Common Shipboard Data Terminal Set (CSDTS), and LINK-11 Baseline Freeze message standard work. The LINK-22 program will improve the performance of both LINK-11 and LINK-16 through the combination of the results of the Critical Systems Demonstration (CSD) project and the NATO Improved LINK-11 (NILE) project. LINK-22 will pass TADIL-J data elements beyond the line of sight (HF) using a Time Division Multiple Access (TDMA) protocol and the improved LINK-11 waveform. These projects will allow more effective employment of fleet units by increasing timeliness, accuracy, and content of tactical data transfer.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

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Exhibit R-2a, RDT&E Budget Item Justification (Project P1743))

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FY 2000 President's Budget Estimates

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205604N

PROJECT NUMBER: P1743

PROGRAM ELEMENT TITLE: Tactical Data Links

PROJECT TITLE: Link-16 Improvements

1. (U) FY 1998 ACCOMPLISHMENTS::

- (U) (\$1,292) Continued design and development of Subphase 2 for the NILE Reference System (NRS).
- (U) (\$1,177) Continued preparing for U.S. implementation of LINK-22 including CDLMS/CSDTS upgrades.

2. (U) FY 1999 PLAN:

- (U) (\$1,136) Continue design and development of Subphase 2 for the NILE Reference System (NRS).
- (U) (\$1,494) Continue Link-22 system development. Link-22 shall receive a NILE SNC Beta software version and shall conduct preliminary performance testing in a laboratory environment. Crypto design and message standards will be evaluated.
- (U) (1,791) Began combined CDLMS/Link 22 program enhancements.

3. (U) FY 2000 PLAN:

- (U) (\$271) Complete design and development of Subphase 2 for the NILE Reference System (NRS).
- (U) (\$500) Commence validation of Link 22 design to ensure interoperability with NILE Reference System (NRS) under NILE In-Service Support Phase MOU.
- (U) (\$1,898) Continue Link-22 system development. Link-22 program shall perform final SNC beta software verification and performance tests. Message standards and Signal Processing Controller functions will be defined for U.S. implementation.
- (U) (\$1,538) Continue combined CDLMS/Link-22 program enhancements. CDLMS/Link-22 specifications/designs will be baselined for final system integration.

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DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205604N

PROJECT NUMBER: P1743

PROGRAM ELEMENT TITLE: Tactical Data Links

PROJECT TITLE: Link-16 Improvements

B. (U) PROGRAM CHANGE SUMMARY:

(U) Funding: FY 1998 decrease of \$50K was due to a \$42K SBIR reduction and \$8K Navy reprogramming for cancelled accounts.
 FY 1999 decrease of \$11K was due to congressional adjustments.
 FY 2000 decrease of \$59K was due to pricing adjustments.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in Thousands)

NUMBER TITLE	FY 1998 ACTUAL	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) OPN Line 2614 ATDLS	14,221	32,885	19,143	16,894	21,335	23,154	33,732	33,018	CONT	CONT

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DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205604N

PROJECT NUMBER: P1743

PROGRAM ELEMENT TITLE: Tactical Data Links

PROJECT TITLE: Link-16 Improvements

D. (U) ACQUISITION STRATEGY:

FY 1998

FY 1999

FY 2000

TO COMPLETE

Program
Milestones

Engineering
Milestones

T&E
Milestones

Contract
Milestones

NRS Test
2Q/00

Link-22
DT/OT 1Q/02

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Exhibit R-2a, RDT&E Budget Item Justification (Project P1743))

PROJECT NUMBER: P1743

Exhibit R-3 Cost Analysis (page 1)										
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date	Cost To Complete	Total Cost	Target Value of Contract
NATO Improved Link Eleven	Various	Various	1,022	1,136	Various	771	Various	1,000	3,929	3,929
LINK-22	WX	SPAWARSSCTR San Diego, CA	1,304	3,285	Various	3,436	Various	Cont.	Cont.	Cont.
C2P Improvements	Various	Various	1,576						1,576	1,576
Subtotal Product Development			3,902	4,421		4,207		Cont.	Cont.	Cont.
Remarks:										
Support and Management	Various	Various	270	0		0		0	270	270
Subtotal Support			270	0		0		0	270	270
Remarks										

Exhibit R-3, Project Cost Analysis

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FY 2000 President's Budget Estimates

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205604N

PROJECT NUMBER: P1743

Cost Categories	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Test and Evaluation	Various	Various	272	0		0		0	272	272
Subtotal T&E			272	0		0		0	272	272
Remarks										
Subtotal Management			0	0		0		0	0	0
Remarks										
Total Cost			4,444	4,421		4,207		Cont.	Cont.	Cont.
Remarks										

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Exhibit R-3, Project Cost Analysis

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FY 2000 President's Budget Estimates

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205604N

PROJECT NUMBER: P2126

PROGRAM ELEMENT TITLE: Tactical Data Links

PROJECT TITLE: ATDLS Integration

(U) COST (Dollars in Thousands)

PROJECT

NUMBER & TITLE	FY 1998 ACTUAL	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
P2126 ATDLS Integration	38,404	44,730	42,459	18,407	13,346	17,003	17,478	19,649	CONT	CONT

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The ATDLS Integration program will integrate the Multifunctional Information Distribution System - Low Volume Terminal (MIDS-LVT) LINK-16 terminal into U.S. Navy platforms. This multinational (U.S., France, Germany, Italy, and Spain) cooperative development program was established to design, develop, and deliver low-volume lightweight tactical information system terminals for U.S. and foreign fighter aircraft, helicopters, ships and ground sites. The terminals are designed as a Pre-Planned Product Improvement (P³I) of the Joint Tactical Information Distribution System (JTIDS) Time Division Multiple Access (TDMA) Class II terminal. The goal of the MIDS-LVT program is to produce a terminal that is smaller, lighter, fully compatible with, and as capable as the JTIDS TDMA Class 2 terminals, but suitable for use in platforms that cannot accommodate the bulkier, heavier JTIDS TDMA Class II equipment. This project includes the costs to integrate and test MIDS on the Navy's F/A-18 and selected ship platforms. ATDLS Integration of the MIDS-LVT will also provide selected U.S. Navy and U.S. Marine Corps tactical aircraft, U.S. Navy ships, and U.S. Marine Corps ground units with crypto-secure, jam resistant, low-probability-of-exploitation communication of tactical data and voice at a high data rate. It will have additional capabilities of common grid navigation and automatic relay inherent in the equipment that will enable long range communication and provide jam resistance. The system will be interoperable among all services and NATO/Allied users equipped with MIDS-LVT or JTIDS Class II/IIA.

(U) ATDLS Improvement program also develops new and improved capabilities for Navy TADIL-J users. The Command and Control Processor (C2P) is a software development effort that provides an interface between the TADILs (Link 4A, 11, and 16) and major surface ship Command and Control Systems (Advanced Combat Direction System (ACDS) and AEGIS C&D). Common Data Link Management System (CDLMS) is a Pre-planned Product Improvement (P3I) of the C2P. The CDLMS will provide translation between TADILs and isolate all tactical data link equipment, message standards and protocols from tactical information processors. This will provide a flexible capability for rapidly exchanging tactical information using a single data base for translating various link formats while remaining completely independent of communications equipment and tactical data computing systems.

(U) This project also funds: (1) the development required to accommodate expanded LINK-16 operational capabilities for additional warfare areas, (2) development of automated network management aids, and (3) systems engineering and contractor support efforts.

(U) Additional terminal development costs are funded in program element 0604771D.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

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Exhibit R-2a, RDT&E Budget Item Justification (Project P2126)

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DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205604N

PROJECT NUMBER: P2126

PROGRAM ELEMENT TITLE: Tactical Data Links

PROJECT TITLE: ATDLS Integration

1. (U) FY 1998 ACCOMPLISHMENTS:

- (U) (\$24,119) Continued F/A-18 MIDS integration software and aircraft design modifications and testing.
- (U) (\$3,681) Continued TADIL-J System Engineering.
- (U) (\$3,651) Continued Performance Upgrades.
- (U) (\$4,894) Continued MIDS-LVT implementation (MIDS on Ship).
- (U) (\$2,059) Integrate Air Defense Systems Integrator with Global Command and Control System into the USS Mt. Whitney.

2. (U) FY 1999 PLAN:

- (U) (\$31,486) Continue F/A-18 MIDS integration software and aircraft design modifications and testing.
- (U) (\$3,825) Continue TADIL-J System Engineering.
- (U) (\$5,426) Continue Performance Upgrades.
- (U) (\$3,993) Continue MIDS-LVT implementation (MIDS on Ship).

3. (U) FY 2000 PLAN:

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DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205604N

PROJECT NUMBER: P2126

PROGRAM ELEMENT TITLE: Tactical Data Links

PROJECT TITLE: ATDLS Integration

- (U) (\$34,038) Continue F/A-18 MIDS integration software and aircraft design modifications and testing.
- (U) (\$3,452) Continue TADIL-J System Engineering.
- (U) (\$4,223) Continue Performance Upgrades.
- (U) (\$746) Complete MIDS-LVT implementation (MIDS on Ship).

B. (U) PROGRAM CHANGE SUMMARY:

(U) Funding:

- FY 98 increase of \$989K was a result of a Navy reprogramming of \$731K for Satellite TADIL-J, \$2,059K for Air Defense System Integrator, a Navy programmatic adjustment of -\$680K, a SBIR adjustment of -\$798K and Navy reprogramming of -\$323K
- FY 99 decrease of \$595K was for congressional adjustments.
- FY 00 increase of \$11,014K was due to a Navy adjustment of -\$2,866K for IT-21, and \$14,500 for F/A18 MIDS Integration; and pricing adjustment of -\$620K.
- U) Schedule: EMD terminal immaturity has delayed the start of DT-IIA-3 and OT-IIA-2 from 2Q/99 to 3Q/99. This same immaturity will delay DT-IIA-5 and OT-IIA-3 from 4Q/99 to 1Q/00.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in Thousands)

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Exhibit R-2a, RDT&E Budget Item Justification (Project P2126)

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DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205604N

PROJECT NUMBER: P2126

PROGRAM ELEMENT TITLE: Tactical Data Links

PROJECT TITLE: ATDLS Integration

NUMBER TITLE	FY 1998 ACTUAL	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) APN LINE										
(U) # 052500	0	38,272	27,425	70,887	49,941	55,681	55,018	41,353	CONT	CONT
(U) # 054400	794	726	735	742	774	766	805	823	CONT	CONT
(U) RDT&E,DA	53,266	30,512	16,641	16,674	16,975	17,346	17,728	18,118	CONT	CONT
(U) OPN LINE 2614 ATDLS	14,221	32,885	19,143	16,894	21,335	23,154	33,732	33,018	CONT	CONT
(U) SCN	6,500	11,900	19,600	25,500	22,000	24,400	22,000	21,000	CONT	CONT

(U) RELATED RDT&E:

- (U) PE (0604771D P771) - Link 16: Link 16 systems engineering support.
 (U) PE (0604771D P773) - MIDS: MIDS-LVT terminal development.

D. (U) ACQUISITION STRATEGY:

FY 1998

FY 1999

FY 2000

FY 2001

TO COMPLETE

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Exhibit R-2a, RDT&E Budget Item Justification (Project P2126)

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DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205604N

PROJECT NUMBER: P2126

PROGRAM ELEMENT TITLE: Tactical Data Links

PROJECT TITLE: ATDLS Integration

Program
Milestones

DAB MS III 3Q/00

IOC 1Q/01 Ship

IOC 2Q/03 Air

Engineering
MilestonesOT-IIID2 2/98
DT-IIIC2 6/98F/A-18 DT-IIA-4 1Q/99
F/A-18 DT-IIA-3 3Q/99
F/A-18 OT-IIA-2 3Q/99F/A-18 TECHEVAL 1Q/01
F/A-18 OPEVAL 4Q/01

F/A-18 FOT&E 2Q/03

T&E
MilestonesF/A-18 DT-IIA-5 1Q/00
F/A-18 OT-IIA-3 1Q/00

Ship DT/OT-IIB-1 4Q/99

Ship DT/OT-IIB-2 1Q/00

Ship FOT&E 1Q/01

Contract
Milestones

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Exhibit R-2a, RDT&E Budget Item Justification (Project P2126)

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FY 2000 President's Budget Estimates

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205604N

PROJECT NUMBER: P2126

Exhibit R-3 Cost Analysis (page 1)											
APPROPRIATION: RDT&E,N BUDGET ACTIVITY : 7				PROGRAM ELEMENT: 0205604N				Tactical Data Links			
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY's Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date	Cost To Complete	Total Cost	Target Value of Contract	
F/A-18 Integration	PD	NAVAIRSYSCO M	71,430	27,000	Various	25,350	Various	18,000	141,780	141,780	
F/A-18 Integration	WX	Pax River, MD	0	850	Various	450	Various	Cont.	Cont.	Cont.	
TADIL-J System Engineering	WX	San Diego, CA	22,462	1,174	Various	1,872	Various	Cont.	Cont.	TBD	
TADIL-J System Engineering	WX	San Diego, CA	502	548	Various	545	Various	Cont.	Cont.	TBD	
MIDS on Ship	SS/CPIF	San Diego, CA	7,718	1,500	Dec 98			0	9,218	9,218	
		GEC Marconi Wayne, NJ									
		N0003996C0094									
Performance Upgrades	WX	SPAWARSYSCOM	3,652	5,426	Various	3,649	Various	0	12,727	12,727	
MIDS on Ship	Various	San Diego, CA	41,407	1,693	Various	246	Various	0	43,346	43,346	
Air Defense Systems Integrator	CPFF	Adv Programming Concepts, TX	2,059								
Subtotal Product Development			149,230	38,191		32,112		Cont.	Cont.	Cont.	
Remarks:											

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FY 2000 President's Budget Estimates

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205604N

PROJECT NUMBER: P2126

Exhibit R-3 Cost Analysis (page 2)											
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY's Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date	Cost To Complete	Total Cost	Target Value of Contract	
Support and Management	Various	Various	0	957	Various	973	Various	Cont.	Cont.	Cont.	
Subtotal Support			0	957		973		Cont.	Cont.	Cont.	
Remarks											

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DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205604N

PROJECT NUMBER: P2126

Exhibit R-3 Cost Analysis (page 3)

Cost Categories	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Test and Evaluation	Various	Various	3,580	221	Various	200	Various	961	4,962	4,962
MIDS T&E	WX	SPAWARSSCOM	4,549	4,143	Various	8,243	Various	Cont.	Cont.	Cont.
		San Diego, CA								
MIDS on Ship T&E	WX	SPAWARSSCOM		800	Dec 98	500	Dec 99	0	1,300	1,300
		MSan Diego, CA								
MIDS Test Assets	SS/CPAF/IF	MIDSCO Fairfield, NJ	6,594	0	N/A	0	N/A	0	6,594	6,594
Subtotal T&E			14,723	5,164		8,943		Cont.	Cont.	Cont.
Remarks										
Project Management										
ATDLS Engineering	RCP	MITRE	606	418	Dec 98	431	Nov 99	Cont.	Cont.	Cont.
		McLean, VA								
Subtotal Management			606	418		431		Cont.	Cont.	Cont.
Total Cost			164,559	44,730		42,459		Cont.	Cont.	Cont.

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Exhibit R-3, Project Cost Analysis

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APPROPRIATION/BUDGET ACTIVITY: RDT&E/N/ 07		Exhibit R-2, RDT&E Budget Item Justification		R-1 ITEM NOMENCLATURE		Date: February 1999	
				Surface ASW Combat System Integration/ 0205620N			

COST (\$ in Millions)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Total PE Cost	12.2	13.0	16.6	19.6	18.4	15.8	7.4	6.5	CONT.	CONT.
High Dynamic Range Low Cost Towed Array Receiver/ V2662	0	4.0	0	0	0	0	0	0	0	4.0
ASW Combat Systems Integration/ V0896	0.5	2.0	2.9	3.7	2.2	2.1	0	0	CONT.	CONT.
Surf ASW System Improvements/ V1916	11.7	7.0	13.7	15.9	16.2	13.7	7.4	6.5	CONT.	CONT.
Quantity of RDT&E Articles & cost										

A. Mission Description and Budget Item Justification: The objective of this program element is to incrementally modernize existing AN/SQQ-89(V) and Surface Ship Sonar Systems. It will improve AN/SQQ-89(V) Measures of Performance (MOP) by enhancing detection, tracking, classification, data processing and display capabilities, and increasing acoustic sensor frequency bandwidth. This PE will take advantage of the AN/SQQ-89(V) open system architecture to develop and integrate the Multi-Function Towed Array (MFTA) into the AN/SQQ-89(V)15 as a backfit program. Further, this program element, under project V2662 in FY 1999, will produce a single Towed Array Acoustic Intercept Subsystem (AISS) ship set and transition the AISS technology to the surface combatant AN/SQQ-89(V)15 with MFTA baseline for integration.

B. Program Change Summary:

FY 1999 President's Budget:
Appropriated Value:

Adjustment to FY 1998 Appropriated Value/
FY 1999 President's Budget:

- a. Sonar Windows / Domes Reprogramming +5.9
- b. SBIR Transfer -0.3
- c. Below Threshold Reprogramming -1.0
- d. Surface ASW Imp Program Realignment
- e. Congressional Undistributed Reductions -0.4
- f. Minor Pricing Adjustments
- g. Congressional Add for AISS

FY 2000 PRES Budget Submit:

	FY 1998	FY 1999	FY 2000
	7.6	9.4	15.6
	8.0	9.4	
			+ 1.2
		- 0.4	- 0.2
		+ 4.0	
		13.0	16.6

Funding: FY 1998 increase for fiberglass-rubber composite bow dome prototype (+5.9). FY 1998 decreases for Small Business Innovative Research (SBIR) transfer (-0.3), sponsor directed BTR (-1.0), and Congressional undistributed reductions (-0.4). FY 1999 Congressional increase for AISS development (+4.0). FY 2000 (+1.2) increase for development of a Digital Torpedo Interface. FY 1999 (-0.4) and FY 2000 (-0.2) decreases for Minor Pricing Adjustments.

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Exhibit R-2 RDT&E Budget Item Justification
(Exhibit R-2, Page 1 of 13)

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Exhibit R-2a, RDT&E Project Justification		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY	ASW Combat System Integration/ V0896	
RDT&E,N/ 07	0205620N	

Cost (\$ in Millions)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Project Cost	0.5	2.0	2.9	3.7	2.2	2.1	0	0	CONT.	CONT.
RDT&E Articles Qty										

A. Mission Description and Budget Item Justification: The Surface ASW Combat Systems Integration project will develop the MFTA specification, towed array and common processing subsystem. It will then integrate the active classification upgrades and torpedo alertment capabilities developed under project V1916 into the MFTA. The MFTA will improve AN/SQQ-89(V) MOP by increasing sensor acoustic bandwidth, providing bistatic capability, and making processing improvements to overcome the negative effects of shallow water. These MOPs relate directly to platform survivability and operational effectiveness in the littoral environment.

PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1998 ACCOMPLISHMENTS:

- (\$0.2) Purchased Navy common telemetry. Began integration and test of the ability of the Navy common telemetry and towed array hardware to function as the receiver for the mid-frequency active sonar, torpedo defense, and BroadBand Variable Depth Sonar.
- (\$0.3) Began system design specification development for the MFTA array and processor. Evaluated Towed Active Receiver Subsystem (TARS) Handling System Engineering changes for MFTA. Began the requisite studies and investigations to resolve engineering issues to support Installation Control Drawings.

2. FY 1999 PLAN:

- (\$0.700) Complete system design specification development for the MFTA array and processor.
- (\$0.658) Begin fabrication of MFTA array parts.
- (\$0.600) Begin development and integration of the MFTA processing.
- (\$0.042) Portion of extramural program is reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. FY 2000 PLAN:

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Exhibit R-2a RDT&E Project Justification
(Exhibit R-2, Page 2 of 13)

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APPROPRIATION/BUDGET ACTIVITY		Exhibit R-2a RDT&E Project Justification		Date: February 1999
RDT&E, N/ 07		Surface ASW Combat System Integration/ 0205620N	ASW Combat System Integration/ V0896	

- (\$0.8) Complete fabrication of MFTA array parts.
- (\$1.8) Continue development and integration of the MFTA processing system and array.
- (\$0.3) Coordinate and conduct 4Q MFTA sea test and prepare analysis of results.

B. Other Program Funding Summary:

	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Complete	Total Cost
OPN P-1 Line Item 45 (BLI 213600, 213605)	17.6	23.3	31.9	27.3	29.5	37.6	62.1	64.3	CONT.	CONT.

Related RDT&E: PE 0603553N (Surface Anti-Submarine Warfare) - Advanced ASW Development

C. Acquisition Strategy: Development work in this project is performed primarily by:

- Naval Undersea Warfare Center, Newport - AN/SQQ-89(V) Technical Direction Agent
- Lockheed Martin Corporation - Incumbent AN/SQQ-89(V) Design Agent. This contract was awarded competitively and will extend through FY 2001.
- Chesapeake Sciences Corporation - SBIR Phase III Award (June 98) for common Navy Towed Array Telemetry.
- Applied Hydro Acoustics - Competitive Contract awarded by SPAWARSSCOM.

Procurement of the MFTA array components will be from Chesapeake Sciences Corporation and array fabrication will be done by the winner of a competitive Omnibus Towed Array contract.

D. Schedule Profile:

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Exhibit R-2a RDT&E Project Justification
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Exhibit R-2a, RDT&E Project Justification			Date: February 1999
APPROPRIATION/BUDGET ACTIVITY	Surface ASW Combat System Integration/ 0205620N	ASW Combat System Integration/ V0896	
RDT&E, N/ 07			

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>
Program	1Q Begin							First
Milestones	MFTA Project					Complete MFTA Project		(V)15+MFTA Installation (2 Systems)
Engineering Milestones		4Q Complete MFTA System Design Specification			2Q Complete Final MFTA Processing Build 5	Transition to MFTA Production		
T&E Milestones			4Q MFTA Sea Test	2Q and 4Q MFTA Sea Tests	2Q and 4Q MFTA Sea Tests		4Q Production Sea Test	
Contract Milestones		Towed Array Omnibus Contract						

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Exhibit R-2a RDT&E Project Justification
(Exhibit R-2, Page 4 of 13)

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Exhibit R-3 Cost Analysis		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY	Surface ASW Combat System Integration/ 0205620N	ASW Combat System Integration/ V0896
RDTE&N/ 07		

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Award Date	FY00 Award Date	FY00 Cost	FY99 Cost	Cost To Complete	Total Cost	Target Value of Contract
Primary H/W & S/W Development	Var.	Misc.	0.2	Var.	Var.	2.1	1.5	CONT.	CONT.	
Subtotal Product Development			0.2			2.1	1.5	CONT.	CONT.	

Remarks:

Budgeted for Lockheed Martin award fees (\$M): 0.1 in FY99 and 0.1 in FY00. There has been no award fee awarded in prior years in this project.

Studies, Analysis, & Evaluations	Var.	Misc.	0.1	Var.	Var.	0.1	0.1	CONT.	CONT.	
Engineering & Technical Services	Var.	Misc.	0.1	Var.	Var.	0.2	0.2	CONT.	CONT.	
Subtotal Support			0.2			0.3	0.3	CONT.	CONT.	

Remarks:

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Award Date	FY00 Award Date	FY00 Cost	Cost To Complete	Total Cost	Target Value of Contract
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Exhibit R-3 Project Cost Analysis
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Exhibit R-2a, RDT&E Project Justification		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY	Surface ASW Combat System Integration/ 0205620N	Surface ASW System Improvements/ V1916
RDT&E, N/ 07		

Cost (\$ in Millions)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Project Cost	11.7	7.0	13.7	15.9	16.2	13.7	7.4	6.5	CONT.	CONT.
RDT&E Articles Qty										

A. Mission Description and Budget Item Justification: The Surface ASW Systems Improvements project will support essential performance enhancements on AN/SQQ-89(V) and Surface Ship Sonar Systems. This project will develop and refine active classification and display upgrades to support implementation in both the AN/SQQ-89(V) hull subsystem and the MFTA. This project will integrate the MFTA, completed in project V0896, with the AN/SQQ-89(V)15 for backfit on DDG51 class ships (AN/SQQ-89(V)15A). Additionally, project V1916 will develop an interplatform ASW data link, design and interface with the Light Airborne Multi-Purpose (LAMPS) Mk III Blk II system, improve torpedo recognition algorithms and provide a digital torpedo interface to the AN/SQQ-89(V) Underwater Fire Control System (UFCS).

PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1998 ACCOMPLISHMENTS:

- (\$1.3) Completed evaluation of the Surveillance Towed Array Sensor System (SURTASS) passive software Build 12 for incorporation into the AN/SQQ-89(V).
- (\$2.3) Completed TARS mid-frequency bistatic towed array processor Advanced Development Model (ADM). Supported TARS array white ship sea test. Participated in TARS ADM gray ship demonstration. PE 0205620N provided the mid-frequency bistatic towed array processor components (dry-end).
- (\$0.9) Supported transition of active classification upgrade algorithms to improve Echo Tracker Classifier (ETC) capability in active classification.
- (\$0.7) Established requirements for and demonstrated feasibility of an ASW Data Link (virtual) to support multi-platform coordinated ASW.
- (\$0.2) Supported Navy-wide towed array efforts.
- (\$0.6) Conducted DT-IIIAN sea test assist and data analysis on an AN/SQQ-89(V) system with adjunct processing including torpedo alertment and data fusion capabilities.

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Exhibit R-2a RDT&E Project Justification
(Exhibit R-2, Page 7 of 13)

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Exhibit R-2a, RDT&E Project Justification		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY	Surface ASW Combat System Integration/ 0205620N	Surface ASW System Improvements/ V1916
RDT&E,N/ 07		

- (\$4.4) Contracted for completion of preliminary design, test and analysis, preparation of detail design, tooling modifications and development of room-temperature-cured composite dome prototype.
 - (\$1.3) Provided technical direction, configuration management, quality assurance, and preparation of engineering changes for conversion to composite dome technology. Supported composite dome sea trial.
2. FY 1999 PLAN:
- (\$1.300) Complete analysis of data from TARS FY 1998 sea tests and coordinate and conduct FY 1999 TARS sea test and prepare analysis of results.
 - (\$0.700) Complete performance specification development for the TARS Engineering Development Model (EDM) to include active classification display upgrades and transition into the MFTA program.
 - (\$1.214) Continue transition of active classification upgrade algorithms for ETC to support implementation with the hull sensor and mid-frequency active MFTA.
 - (\$0.300) Begin development of an ASW Data Link (virtual) to support multi-platform coordinated ASW.
 - (\$0.200) Continue support of Navy-wide towed array commonality development efforts.
 - (\$0.700) Conduct developmental test, DT-III AO, of an AN/SQQ-89(V)6 system, and commence planning for an operational test and evaluation, OT-III G, on an AN/SQQ-89(V)6 system with active adjunct processing and the Sonar In-Situ Mode Assessment System (SIMAS) upgrade.
 - (\$0.300) Provide performance data analysis and modeling and simulation using MOP and Measures of Effectiveness (MOE) methods.
 - (\$0.200) Begin program planning and requirements definition for the LAMPS Mk III Blk II system, identify critical system performance items, establish new interfaces for the KuBand LAMPS Common Datalink (CDL), and explore methods of backfitting these changes to the maximum number of ships.
 - (\$1.200) Continue upgrades to the Torpedo Recognition Alertment Functional Segment (TRAFS) as well as develop improved torpedo detection algorithms for the AN/SQQ-89(V).

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Exhibit R-2a RDT&E Project Justification
(Exhibit R-2, Page 8 of 13)

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Exhibit R-2a, RDT&E Project Justification		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E, N/ 07	Surface ASW Combat System Integration/ 0205620N	Surface ASW System Improvements/ V1916

- (\$0.800) Investigate AN/SQQ-89(V) display commonality issues, minimize display formats, and standardize operator-machine interfaces.
 - (\$0.086) Portion of extramural program is reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.
3. FY 2000 PLAN:
- (\$0.5) Continue development of an ASW Data Link (virtual) to support multi-platform coordinated ASW.
 - (\$0.2) Continue support of Navy-wide towed array commonality development efforts.
 - (\$0.6) Complete sea test analysis of FY 1999 DT-III AO on an AN/SQQ-89(V)6 system, and conduct operational test and evaluation, OT-IIIH, of an AN/SQQ-89(V)6 system.
 - (\$0.4) Continue performance data analysis and modeling and simulation using MOP and MOE methods.
 - (\$2.6) Write system performance specification changes, complete KuBand LAMPS CDL data definition, write shipboard and aircraft computer program design changes, and begin writing source code changes.
 - (\$1.3) Continue upgrades to the Torpedo Recognition Alertment Functional Segment (TRAFS) as well as develop improved torpedo detection algorithms for the AN/SQQ-89(V).
 - (\$0.3) Continue investigation of AN/SQQ-89(V) display commonality issues, minimize display formats, and standardize operator-machine interfaces.
 - (\$6.6) Begin development of mid-frequency MFTA active classification and display upgrades.
 - (\$1.2) Begin design specification for the Digital Torpedo Interface to the AN/SQQ-89(V) UFCs.

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Exhibit R-2a RDT&E Project Justification
(Exhibit R-2, Page 9 of 13)

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APPROPRIATION/BUDGET ACTIVITY		Exhibit R-2a, RDT&E Project Justification	Date: February 1999
RDT&E, N/ 07		Surface ASW Combat System Integration/ 0205620N	Surface ASW System Improvements/ V1916

B. Other Program Funding Summary:

	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Complete	Total Cost
OPN P-1 Line Item 45 (BLI 213600, 213605)	17.6	23.3	31.9	27.3	29.5	37.6	62.1	64.3	CONT.	CONT.

Related RDT&E: PE 0603553N (Surface Anti-Submarine Warfare) - Advanced ASW Development

C. Acquisition Strategy: Development work in this project is performed primarily by:

- Naval Undersea Warfare Center, Newport - AN/SQQ-89(V) Technical Direction Agent
- Naval Surface Warfare Center, Dahlgren - Mk 116 Fire Control Technical Direction Agent
- Lockheed Martin Corporation - Incumbent AN/SQQ-89(V) Design Agent. This contract was awarded competitively and will extend through FY 2001.
- Naval Research Laboratory - Technical Direction Agent for Sonar Dome Rubber Windows/ and Sonar Rubber Domes (SDRW/SRD)
- B.F. Goodrich Corporation - SDRW/SRD Production Contractor

Procurement of the AN/SQQ-89(V)15 integrated with the MFTA in this project will commence in FY 2003 on a competitive contract awarded in the FY 2002 time frame.

D. Schedule Profile:

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Exhibit R-2a RDT&E Project Justification
(Exhibit R-2, Page 10 of 13)

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APPROPRIATION/BUDGET ACTIVITY		Exhibit R-2a, RDT&E Project Justification		Date: February 1999
RDT&E/N/ 07		Surface ASW Combat System Integration/ 0205620N	Surface ASW System Improvements/ V1916	

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>
Program Milestones		Begin LAMPS Mk III Blk II Integration	Begin Digital Torpedo Interface for AN/SQQ-89(V) UCFS	Begin MFTA Integration into AN/SQQ-89(V)15		Complete MFTA Integration into AN/SQQ-89(V)15 Complete LAMPS Mk III Blk II Integration	Complete Digital Torpedo Interface for AN/SQQ-89(V) UCFS	First (V)15+MFTA Installation (2 Systems)
Engineering Milestones	4Q Complete SURTASS Passive Evaluation	4Q Complete FY98/ FY99 TARS ADM Sea Test Analysis						
		4Q Complete TARS EDM Performance Spec Dev						
T&E Milestones	2Q and 4Q TARS ADM Sea Tests	4Q DT-III AO Sea Test 2Q TARS ADM Sea Test	3Q OT-IIIH Sea Test		2Q DT-IIIAP and OT-IIIJ Sea Tests		2Q DT-III AQ and OT-IIIK Sea Tests	
Contract Milestones						Award new competitive AN/SQQ-89(V)15 procurement contract		

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Exhibit R-2a RDT&E Project Justification
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Exhibit R-3 Cost Analysis		Date: February 1999	
APPROPRIATION/BUDGET ACTIVITY		Surface ASW Combat System Integration/ 0205620N	
RDT&E/N/ 07		Surface ASW System Improvement/ V1916	

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Award Cost	FY99 Award Date	FY00 Cost	FY00 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Primary H/W & S/W Development	WR	NUWC/NPT	17.5	1.4	10/98	2.6	10/99	CONT.	CONT.	
Primary H/W & S/W Development	C/CPAF	Lockheed Martin, NY	2.5	2.0	12/98	3.7	12/99	0.0	8.3	8.3
Primary H/W S/W Development	Var.	Misc.	23.6	1.1	Var.	5.0	Var.	CONT.	CONT.	
Common Systems Engineering	Var.	Misc.	0.4	0.2	Var.	0.2	Var.	CONT.	CONT.	
Subtotal Product Development			44.0	4.7		11.5		CONT.	CONT.	

Remarks:

Budgeted for Lockheed Martin award fees (\$M): 0.2 in FY99 and 0.2 in FY00. Lockheed Martin's performance has been excellent in prior years, earning 100% of possible award fee for the past four award fee periods.

Studies, Analysis, & Evaluations	Var.	Misc.	0.9	0.2	Var.	0.2	Var.	CONT.	CONT.	
Engineering & Technical Services	Var.	Misc.	1.5	0.3	Var.	0.3	Var.	CONT.	CONT.	
Subtotal Support			2.4	0.5		0.5		CONT.	CONT.	

Remarks:

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total Pys Cost	FY99 Award Cost	FY99 Award Date	FY00 Cost	FY00 Award Date	Cost To Complete	Total Cost	Target Value of Contract
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Exhibit R-3 Project Cost Analysis
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Exhibit R-3 Cost Analysis	Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E/N/ 07	Surface ASW Combat System Integration/ 0205620N Surface ASW System Improvement/ V1916

Developmental & Operational T&E	Var.	Misc.	3.6	0.7	Var.	0.6	Var.	CONT.	CONT.
Miscellaneous T&E	Var.	Misc.	2.3	0.3	Var.	0.4	Var.	CONT.	CONT.
Subtotal T&E			5.9	1.0		1.0		CONT.	CONT.

Remarks:

Program Management Support	Var.	Misc.	3.4	0.8	Var.	0.7	Var.	CONT.	CONT.
Subtotal Management			3.4	0.8		0.7		CONT.	CONT.

Remarks:

Total Cost			55.7	7.0		13.7		CONT.	CONT.
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Remarks:

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Exhibit R-3 Project Cost Analysis
(Exhibit R-3, Page 13 of 13)

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Exhibit R-2, RDT&E Budget Item Justification										Date: February 1999
APPROPRIATION/BUDGET ACTIVITY: RDT&E,N / 7										
R-1 ITEM NOMENCLATURE										
Program Element (PE) Name and No. MK48 ADCAP/0205632N										
COST (\$ in Millions)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Total P.E. Cost	10.3	17.4	20.4	15.6	17.1	18.2	22.8	30.3	CONT.	CONT.
MK48 ADCAP / V0366	10.3	17.4	20.4	15.6	17.1	18.2	22.8	30.3	CONT.	CONT.
Quantity of RDT&E Articles & cost	26 / 2.3	3.2	3.5	5.1	1.8	0.6				
A. (U) Mission Description and Budget Item Justification:										
<p>The MK 48 ADCAP (Advanced CAPability) torpedo R&D program focuses on two specific areas through FY05: Guidance and Control (G&C) software block upgrades and wideband sonar capability. The Chief of Naval Operations continues to stress shallow water (less than 600 feet) as a critical operating area to counter third world diesel electric submarines. Torpedo testing in shallow water has demonstrated that in-service ADCAP has less than full capability in this difficult environment. However, this testing, in conjunction with laboratory simulation efforts, has shown that significant performance improvements can be made by implementing changes to weapon tactics and software algorithms. Development, implementation and testing of these changes is being accomplished under the ADCAP G&C software block upgrade program.</p> <p>(U) The focus of the MK 48 ADCAP torpedo R&D program for FY99 and out has shifted from being primarily concentrated on Software Block Upgrade efforts to a coordinated hardware/software upgrade for countering evolving threats and maintaining robust performance. Countermeasure (CM) sophistication and availability on the open market directly affects ADCAP kill proficiency and its ability to counter rapidly evolving threats. The Common Broadband Advanced Sonar System (CBASS) program will develop and field a wideband sonar capable of identifying CMs and discriminating them from the target. CBASS will procure 26 test articles (6 prototypes and 20 Engineering Development Models (EDMs)). CBASS met Milestone II requirements on 6 March 1998 and received MDA approval to proceed into EMD. Full rate production and IOC are scheduled for FY04.</p> <p>(U) The introduction of phased prototyping in FY03 will provide a more rapid technology transition path for incremental torpedo improvements and upgrades (including the development and test of New Technology Concepts from the R&D community (6.2/6.3) and contractor Independent Research and Development (IR&D)). This approach will incorporate accelerated in-water testing of the new concepts allowing early Fleet input into future ADCAP upgrades and help to provide the foundation for Next Generation Torpedoes. These efforts will continue torpedo development investment at a lower cost and shorter term than traditional torpedo programs.</p>										

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Exhibit R-2 RDT&E Budget Item Justification
(Exhibit R-2, Page 1 of 8)

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Exhibit R-2, RDT&E Budget Item Justification		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY: RDT&E,N / 7		
R-1 ITEM NOMENCLATURE	Program Element (PE) Name and No. MK48 ADCAP/0205632N	
<p>1. (U) FY 1998 ACCOMPLISHMENTS:</p> <ul style="list-style-type: none">• (U) (\$3.5) Continued G&C Software Block Upgrade IV Improvement efforts in support of DT. Conducted validation of safety features for new build releases of software block upgrades. Developed G&C Software improvements to optimize torpedo algorithm and processor effectiveness.• (U) (\$1.3) Continued support and upgrade of the Weapon Analysis Facility (WAF) simulator to reflect the latest G&C hardware and software. Continued incremental validation of the WAF to prepare for Block IV OT in FY00.• (U) (\$1.7) Conducted DT of Software Block Upgrade IV. Supported COMSUBPAC priority FOT&E of Software Block Upgrade III.• (U) (\$0.1) Provided for COMOPTEVFOR Block Upgrade IV DT test support.• (U) (\$3.4) Continued development efforts on the CBASS wideband sonar system for the ADCAP MODs torpedo. Awarded CBASS EMD contract for the development and manufacture of prototype wideband sonar systems. Continued to perform trade-offs and comparative analysis on various wideband configurations including technologies being developed through ONR 6.2/6.3 programs.• (U) (\$0.3) Continued development, design and prototype of new propulsion concepts resulting from 6.2 R&D technology. Began the land-based testing of alternate fuels/reduced maintenance propulsion concepts.		

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Exhibit R-2 RDT&E Budget Item Justification
(Exhibit R-2, Page 2 of 8)

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Exhibit R-2, RDT&E Budget Item Justification		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY: RDT&E,N / 7		
R-1 ITEM NOMENCLATURE		
Program Element (PE) Name and No. MK48 ADCAP/0205632N		
2. (U) FY 1999 PLAN:		
<ul style="list-style-type: none">• (U) (\$6.5) Continue the development of G&C Software Block Upgrade IV in preparation for OT in FY00. G&C Software development efforts continue in order to address fleet identified priorities. Conduct validation of safety features for new build releases of software block upgrades.• (U) (\$1.6) Continue to support and upgrade the Weapon Analysis Facility simulator to reflect latest G&C hardware and software. Conduct simulation in support of Block Upgrade IV DT and other software improvements. Continue model validation efforts.• (U) (\$2.8) Complete Developmental Testing and prepare for Operational Testing in FY00 of Software Block Upgrade IV. Support FOT&E of Software Block Upgrade III.• (U) (\$0.1) Provide for COMOPTEVFOR Block Upgrade IV DT test support.• (U) (\$5.7) CBASS EMD efforts continue toward integration of prototype components. Develop advanced wideband algorithms, signal processing, and tactical software. Conduct land-based testing of prototype hardware.• (U) (\$0.6) Continue to develop, design and prototype new propulsion concepts. Continue land-based testing of alternate fuels and reduced maintenance propulsion components.• (U) (\$0.1) Portion of extramural program is reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.		

R-1 Item 165-3 of 165-8

Exhibit R-2 RDT&E Budget Item Justification
(Exhibit R-2, Page 3 of 8)

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Exhibit R-2, RDT&E Budget Item Justification		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY: RDT&E,N / 7		R-1 ITEM NOMENCLATURE
		Program Element (PE) Name and No. MK48 ADCAP/0205632N
3. (U) FY 2000 PLAN:		
<ul style="list-style-type: none">• (U) (\$3.8) Complete the development of G&C Software Block Upgrade IV in support of OT. G&C Software development efforts continue in order to address fleet identified priorities. Conduct validation of safety features for new build releases of software block upgrades.• (U) (\$1.3) Continue to support and upgrade the Weapon Analysis Facility simulator to reflect latest G&C hardware and software. Conduct simulation in support of Block Upgrade IV OT and other software improvements. Continue model validation efforts.• (U) (\$4.4) Complete Operational Testing of Software Block Upgrade IV.• (U) (\$0.3) Provide for COMOPTVFOR Software Block Upgrade IV test support.• (U) (\$10.4) CBASS EMD efforts continue toward integration of prototype components. Develop advanced wideband algorithms, signal processing, and tactical software. Continue land-based testing of prototypes, and begin in-water testing.• (U) (\$0.2) Continue to develop, design and prototype new propulsion concepts. Continue land-based testing of alternate fuels and reduced maintenance propulsion components.		
B. (U) Program Change Summary: (\$ in millions)		

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Exhibit R-2 RDT&E Budget Item Justification
(Exhibit R-2, Page 4 of 8)

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Exhibit R-2, RDT&E Budget Item Justification		Date: February 1999									
APPROPRIATION/BUDGET ACTIVITY: RDT&E,N / 7		R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. MK48 ADCAP/0205632N									
		FY 1998	FY 1999	FY 2000							
(U) FY 1999 President's Budget:		10.5	17.6	18.5							
(U) Appropriated Value:		10.8	17.6								
(U) Adjustments to FY1998 Appropriated Value/FY 1999 President's Budget:		-0.5	-0.2	+1.9							
(U) FY 2000/01 PRES Budget Submit:		10.3	17.4	20.4							
(U) Funding:											
FY98: Reduction of -\$0.5M is due to Congressional Undistributed reductions (-\$0.3M) and SBIR (-\$0.2M).											
FY99: Reduction of -\$0.2M is due to Congressional Undistributed reductions.											
FY00: \$2.0M added to support completion of Software Block Upgrade IV and its OPEVAL and a net reduction of -\$0.1M (due to Congressional Undistributed reductions -\$0.2M and minor pricing adjustments \$0.1M).											
(U) Schedule: Not applicable.											
(U) Technical: The addition of \$2.0M to FY00 permits incorporation of fleet priorities into Software Block Upgrade IV in support of its operational evaluation.											
C. (U) Other Program Funding Summary (\$ in millions)											
		FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Complete	Total Cost
MK48 ADCAP MODS (WPN / PE 0204284N / BA3 / P-1 Item 322500)		53.5	49.3	52.8	38.8	46.6	60.2	59.4	71.2	CONT.	CONT.
D. (U) Acquisition Strategy: CBASS EMD contract was competitively awarded among qualified ADCAP producers.											
E. Schedule Profile:											

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Exhibit R-2 RDT&E Budget Item Justification
(Exhibit R-2, Page 5 of 8)

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Exhibit R-2, RDT&E Budget Item Justification		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY: RDT&E,N / 7		
R-1 ITEM NOMENCLATURE		
Program Element (PE) Name and No. MK48 ADCAP/0205632N		

M K 48 ADCAP Planning Schedule

PROGRAM EFFORTS	FY98	FY99	FY00	FY01	FY02	FY03	FY04	FY05
Software Block Upgrades		BLOCK IV	BLK IV OPEVAL	BLK III/IV FOT&E				
					Continued Software Improvements			
CBASS (Development)	▲		DT	DT	DT/OT	OPEVAL	▲	
	MS II AWARD CONTRACT		▲	▲	▲		MS III	
Torpedo Technology Improvement - Phased Prototyping			PDR CDR		NDA Review			

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Exhibit R-2 RDT&E Budget Item Justification
(Exhibit R-2, Page 6 of 8)

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Exhibit R-3 Cost Analysis			Date: February 1999									
APPROPRIATION/BUDGET ACTIVITY: RDT&E/7			PROGRAM ELEMENT NAME AND NUMBER: MK48 ADCAP/0205632N					PROJECT NAME AND NUMBER: MK48 ADCAP/V0366				
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Award Cost	FY99 Award Date	FY00 Award Cost	FY00 Award Date	FY01 Award Cost	FY01 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development	WR	NUWC Newport, RI	CONT.	1.4	11/98	1.1	10/99	0.2	10/00	CONT.	CONT.	N/A
	C,CPFF	ARL/PSU State College, PA	CONT.	0.3	01/99	0		0		CONT.	CONT.	N/A
Software Development	C,CPIF	Northrop Grumman	CONT.	3.2	10/98	3.5	10/99	5.1	10/00	2.4	16.5	16.5
	WR	NUWC Newport, RI	CONT.	3.4	11/98	2.6	10/99	1.7	10/00	CONT.	CONT.	N/A
Systems Engineering	C,CPFF	ARL/PSU State College, PA	CONT.	0.5	01/99	0.5	10/99	0.4	10/00	CONT.	CONT.	N/A
	WR	NUWC Newport, RI	CONT.	3.5	11/98	2.9	10/99	2.1	10/00	CONT.	CONT.	N/A
Subtotal Product Development			CONT.	12.3		10.6		9.5		CONT.	CONT.	
Remarks: None.												
Subtotal Support												
Remarks: None.												

R-1 Item 165-7 of 165-8

Exhibit R-3 Project Cost Analysis
(Exhibit R-3, Page 7 of 8)

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Exhibit R-3 Cost Analysis				Date: February 1999							
APPROPRIATION/BUDGET ACTIVITY: RDT&E/7				PROJECT NAME AND NUMBER:							
MK48 ADCAP/0205632N				MK48 ADCAP/V0366							
Cost Categories (Tailor to WBS or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 99 Award Date	FY00 Cost	FY00 Award Date	FY01 Cost	FY01 Award Date	Cost To Comple te	Total Cost	Target Value of Contract
Test and Evaluation	WR	NUWC Newport, RI	CONT.	11/98	5.1	10/99	3.9	10/00	CONT.	CONT.	N/A
	VAR	VARIOUS	CONT.	10/98	0.7	10/99	0.2	10/00	CONT.	CONT.	N/A
Modeling & Simulation	WR	NUWC Newport, RI	CONT.	11/98	3.6	10/99	1.7	10/00	CONT.	CONT.	N/A
	C,CPFF	ARL/PSU State College, PA	CONT.	0	0.1	10/99	0		CONT.	CONT.	N/A
Subtotal T&E			CONT.		9.5		5.8		CONT.	CONT.	
Remarks: None.											
Program Management Support	VAR	VARIOUS	CONT.	0.3	0.3	MISC.	0.3	MISC.	CONT.	CONT.	N/A
Subtotal Management			CONT.	0.3	0.3		0.3		CONT.	CONT.	
Remarks: None.											
Total Cost			CONT.	17.4	20.4		15.6		CONT.	CONT.	
Remarks: None.											

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Exhibit R-3 Project Cost Analysis
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EXHIBIT R-2, FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205633N

PROGRAM ELEMENT TITLE: AVIATION IMPROVEMENTS

(U) COST: (Dollars in Thousands)

<u>Project Number & Title</u>	<u>FY 1998 Budget</u>	<u>FY 1999 Budget</u>	<u>FY 2000 Estimate</u>	<u>FY 2001 Estimate</u>	<u>FY 2002 Estimate</u>	<u>FY 2003 Estimate</u>	<u>FY 2004 Estimate</u>	<u>FY 2005 Estimate</u>	<u>To Complete</u>	<u>Total Program</u>
W0601 Common Ground Equipment	2,790	6,141	4,110	3,969	3,587	3,690	3,799	3,902	CONT	CONT
W0852 Consolidated Automated Support System (CASS)	8,045	8,475	8,570	8,819	8,981	9,167	29,084	34,210	CONT	CONT
W1041 Aircraft Equipment Reliability/Maintainability Improvement Program (AERMIP)	1,377	1,315	899	769	672	677	700	719	CONT	CONT.
W1355 Aircraft Engine CIP	35,388	46,167*	39,714	47,526	41,628	37,373	73,135	84,162	CONT.	CONT.
TOTAL	47,600	62,098	53,293	61,083	54,868	50,907	106,718	122,993	Cont	Cont

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Common Ground Equipment is a Naval Aviation Project to apply new technology to common support equipment necessary to support all aircraft. CASS develops standardized Automated test Equipment (ATE) with computer assisted, multi-function capabilities to support the maintenance of aircraft subsystems and missiles. AERMIP is the only Navy program that provides engineering support for in-service out-of-production aircraft equipment and provides increased readiness at reduced operational and support cost. Aircraft Engine CIP develops reliability and maintainability (R&M) and safety enhancements for in-service Navy aircraft engines, transmission, propellers, starters, auxiliary power units, electrical generating systems, fuel systems, and fuels and lubricants.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it encompasses engineering and manufacturing for upgrade of existing operational systems.

*FY-99 budget includes a Congressional add of \$2,000K for Eddy Current Sensors executed under project W2663.

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Exhibit R-2, RDT&E Budget Item Justification
(Exhibit R-2, Page 1 of 25)

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0205633N PROJECT NUMBER: W0601
 PROGRAM ELEMENT TITLE: AVIATION IMPROVEMENTS PROJECT TITLE: Common Ground Equipment

(U) COST: (Dollars in Thousands)

<u>Project Number & Title</u>	<u>FY 1998 Budget</u>	<u>FY 1999 Budget</u>	<u>FY 2000 Estimate</u>	<u>FY 2001 Estimate</u>	<u>FY 2002 Estimate</u>	<u>FY 2003 Estimate</u>	<u>FY 2004 Estimate</u>	<u>FY 2005 Estimate</u>	<u>To Complete</u>	<u>Total Program</u>
W0601 COMMON GROUND EQUIPMENT										
TOTAL	2,790	6,141	4,110	3,969	3,587	3,690	3,799	3,902	CONT	CONT

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project introduces effective, efficient fleet support equipment through the application of new technology, thereby improving fleet supportability and aircraft readiness.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1998 ACCOMPLISHMENTS:

- (U) (\$ 290) Continued Advanced Boresight Equipment development program.
- (U) (\$ 750) Completed USN involvement with USAF Joint Service Electronic Combat Tester (JSECT).
- (U) (\$1054) Continued USN involvement with USAF Next Generation Munitions Handler.
- (U) (\$ 150) Initiated development of Universal Aircraft Axle Jack.
- (U) (\$ 95) Initiated development of an Automated Engine Turning Tool.
- (U) (\$ 145) Initiated and complete development of Universal Chock Adapters.
- (U) (\$ 83) Initiated development of Advanced Armament Trailer A/M 32U-13.
- (U) (\$223) Initiated and completed development of Common Missile Gel Pad.

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT:** 0205633N **PROJECT NUMBER:** W0601
PROGRAM ELEMENT TITLE: AVIATION IMPROVEMENTS **PROJECT TITLE:** Common Ground Equipment

2. FY 1999 PLAN:

- (U) (\$3886) Continue Advanced Boresight Equipment development/LRIP program.
- (U) (\$ 570) Complete JSECT.
- (U) (\$ 957) Continue development of USAF Next General Munitions Handler (NGMH).
- (U) (\$ 155) Complete developing Automated Engine Turning Tool.
- (U) (\$ 490) Initiate and complete development of the Joint Engine Test Initiative (JETI).
- (U) (\$ 83) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. FY 2000 PLAN:

- (U) (\$ 680) Complete Advanced Boresight Equipment LRIP program.
- (U) (\$ 672) Continue development of USAF NGMH.
- (U) (\$ 90) Continue development of Universal Aircraft Axle Jack.
- (U) (\$ 320) Initiate development of Aircraft Engine Monitoring System.
- (U) (\$ 44) Complete development of Advanced Armament trailer A/M 32-13
- (U) (\$ 100) Initiate Joint project with US Army for Non Destructive Inspection (NDI) ultrasonic equipment.
- (U) (\$ 80) Initiate development of CVN/CVX stores and pod stowage.
- (U) (\$ 240) Initiate development of state of-the-art fuel system for Standard Engine Test Set (SETS).

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Exhibit R-2a, RDT&E Project Justification
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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205633N

PROGRAM ELEMENT TITLE: AVIATION IMPROVEMENTS

PROJECT NUMBER: W0601

PROJECT TITLE: Common Ground Equipment

- (U) (\$ 265) Initiate development of Aircraft Engine Test Facility Primary Air Inlet.
- (U) (\$ 220) Initiate development of Rapid Re-configurable Electronic Test Set.
- (U) (\$ 111) Initiate development of Night Vision goggle/SE compatibility.
- (U) (\$ 590) Initiate development of Turbo prop R&D Instrument Modernization.
- (U) (\$ 140) Initiate development of Shaft Load System for small turbine engines.
- (U) (\$ 235) Initiate development of Non-propelled Shipboard Weapons Loader.
- (U) (\$ 168) Initiate development of Turbo Engine Test Enclosure.
- (U) (\$ 55) Initiate and complete development of Expeditionary Airfield Weapons Ready Service Shelter.
- (U) (\$ 100) Initiate and complete development of Graphic User Interface (GUI) interface for Test Program Set (TPS) developers.

(U) B. PROGRAM CHANGE SUMMARY

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
(U) FY 1999 President's Budget:	2,836	6,341	4,187
(U) Appropriated Value:	2,836	6,341	
(U) Adjustments from President's Budget:	(46)	(200)	(77)
(U) FY 2000 President's Budget Submit:	2,790	6,141	4,110

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**Exhibit R-2a, RDT&E Project Justification
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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205633N

PROJECT NUMBER: W0601

PROGRAM ELEMENT TITLE: AVIATION IMPROVEMENTS

PROJECT TITLE: Common Ground Equipment

CHANGE SUMMARY EXPLANATION:

(U) Funding: The FY 1998 decrease of \$46 thousand consists of decreases of \$14 thousand for the Small Business Innovation Research assessment, and \$32 thousand for minor program adjustments. The FY 1999 decrease of \$200 thousand reflects Congressional undistributed reductions. The FY 2000 reduction of \$77 thousand is due to minor pricing adjustments.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

U) C. OTHER PROGRAM FUNDING SUMMARY

Appn	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete
(U) APN-7 (47C2)	115,012	144,802	154,354	123,126	129,370	115,172	118,536	118,548	Cont
(U) O&MN	4,130	4,564	4,850	4,992	5,118	5,246	5,104	5,234	Cont

Related RDT&E:

(U) P.E.: Not Applicable

(U) D. ACQUISITION STRATEGY: This is a non-ACAT program. Field activities propose tentative RDT&E projects. Internal panel merits and selects projects. Field activities develop projects and submit results. Operational Advisory Group (OAG) process selects projects to transition to procurement (APN-7).

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Exhibit R-2a, RDT&E Project Justification
(Exhibit R-2a, Page 5 of 25)

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205633N

PROGRAM ELEMENT TITLE: AVIATION IMPROVEMENTS

PROJECT NUMBER: W0601

PROJECT TITLE: Common Ground Equipment

(U) E. SCHEDULE PROFILE

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>To</u> <u>Complete</u>
(U) Program Milestones				
Universal Chock				
Advanced Boresight Program		1/99 (MSIII)		12/01 (MSIII)
NGMH				12/01 (MSIII)
Automated Engine Turning Tool			1/00 (MSIII)	
Missile Support Pads (Gel)				
Armament Maintenance Trailer	10/98 (MSIII)		1/00 (MSIII)	10/01 (MSIII)
Axle Jack				
(U) Engineering Milestones				
Universal Chock	3/98 (CDR)			
Advanced Boresight Program		8/99 (CDR)		
NGMH	9/98 (CDR)			
Automated Engine Turning Tool	7/98 (CDR)			
Missile Support Pads (Gel)	7/98 (CDR)			
Armament Maintenance Trailer	7/98 (CDR)		7/00 (CDR)	
Axle Jack				
(U) T&E Milestones				
Universal Chock	7/98 (OT)			1/01 (OT)
Advanced Boresight Program				1/01 (OT)
NGMH				
Automated Engine Turning Tool		2/99 (OT)		
Missile Support Pads (Gel)	7/98 (OT)			
Armament Maintenance Trailer	10/98 (OT)			2/01 (OT)
Axle Jack				
(U) Contract Milestones				
Advanced Boresight Program		1/99 (Contract Award)		
Automated Engine Turning Tool	7/98 (Contract Award)			
Missile Support Pads (Gel)	7/98 (Contract Award)			
Armament Maintenance Trailer	7/98 (Contract Award)			

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EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

DATE: Feb 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205633N

PROJECT NUMBER: W0651

PROJECT TITLE: Consolidated Automated Support System

<u>Cost Categories:</u>	<u>Contract Method & Type</u>	<u>Performing Activity & Location</u>	<u>Total Prior Yrs Cost</u>	<u>FY 1999</u>		<u>FY 2000</u>		<u>Cost Complete</u>	<u>Total Cost</u>
				<u>Cost</u>	<u>Date</u>	<u>Cost</u>	<u>Date</u>		
Hardware Development	C/FP	AAI Corp Cockeysville MD	2,760	4,000	1/99	200	1/00	N/A	N/A
Miscellaneous	Various	Various	10,442	2,058	11/98	3,910	11/99	CONT	CONT
Subtotal Hardware Development			13,202	6,058		4,110		CONT	CONT

Remarks:

Subtotal Support

0 0 0 0

Remarks:

Subtotal Test & Evaluation

0 0 0 0

Remarks:

Subtotal Management

0 0 0 0

SBIR Assessment

83

Remarks:

Total Cost

13,202 6,141 4,110 CONT CONT

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Exhibit R-3, Project Cost Analysis
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EXHIBIT R-2a, FY 2000 RDT&E, N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205633N

PROGRAM ELEMENT TITLE: AVIATION IMPROVEMENTS

PROJECT NUMBER: W0852

PROJECT TITLE: Consolidated Automated Support System

(U) COST: (Dollars in Thousands)

<u>Project Number & Title</u>	<u>FY 1998 Budget</u>	<u>FY 1999 Budget</u>	<u>FY 2000 Estimate</u>	<u>FY 2001 Estimate</u>	<u>FY 2002 Estimate</u>	<u>FY 2003 Estimate</u>	<u>FY 2004 Estimate</u>	<u>FY 2005 Estimate</u>	<u>To Complete</u>	<u>Total Program</u>
W0852 Consolidated Automated Support System										
TOTAL	8,045	8,475	8,570	8,819	8,981	9,167	29,084	34,210	Cont	Cont

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Consolidated Automated Support System (CASS) project designs and develops modular constructed automated test equipment with computer-assisted, multi-functional capability based, standardized hardware and software elements. CASS responds to Fleet Commanders' expressed requirements to correct serious deficiencies in existing automatic test equipment. Program objectives are: (1) increase material readiness; (2) reduce life cycle costs through standardization; (3) improve tester sustainability at depot and intermediate maintenance levels; (4) reduce proliferation of unique test equipment and (5) provide test capability for existing and future avionics/electronics systems.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1998 ACCOMPLISHMENTS:

- (U) (\$1400) Continued development of DOD Automated Test System (ATS) standard interfaces and architectures.
- (U) (\$1200) Continued development of A Board Base Environment for Test (ABBET) standards instrument control software.
- (U) (\$ 612) Completed development of High Speed Digital Data Bus interfaces and commence development on Common Bus Emulator Test (CBET).
- (U) (\$1808) Initiated CASS station upgrades to include tunable lasers and wide-band focal plan arrays.
- (U) (\$1832) Initiated development of instrument control upgrades and virtual instruments.
- (U) (\$1193) Initiated development of advanced digital/video process.

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Exhibit R-2a, RDT&E Project Justification
(Exhibit R-2a, Page 8 of 25)

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EXHIBIT R-2a, FY 2000 RDT&E BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205633N

PROGRAM ELEMENT TITLE: AVIATION IMPROVEMENTS

PROJECT NUMBER: W0852

**PROJECT TITLE: Consolidated Automated Support
System**

2. FY 1999 PLAN:

- (U) (\$1000) Continue development of DOD ATS standard interfaces and architectures.
- (U) (\$ 862) Continue development of ABBET standards instrument control software.
- (U) (\$2000) Continue CASS station upgrades to include tunable lasers and wide-band focal plan arrays
- (U) (\$3520) Continue development of instrument control upgrades and virtual instruments.
- (U) (\$1000) Continue development of advanced digital/video process.
- (U) (\$ 93) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. FY 2000 PLAN:

- (U) (\$1100) Continue development of DOD ATS standard interfaces and architectures.
- (U) (\$1000) Continue development of ABBET standards instrument control software.
- (U) (\$2500) Continue CASS station upgrades to include tunable lasers and wide-band focal plan arrays.
- (U) (\$2805) Continue development of instrument control upgrades and virtual instruments.
- (U) (\$1165) Continue development of advanced digital/video process.

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Exhibit R-2a, RDT&E Project Justification
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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205633N

PROJECT NUMBER: W0852

PROJECT TITLE: Consolidated Automated Support System

PROGRAM ELEMENT TITLE: AVIATION IMPROVEMENTS

(U) B. PROGRAM CHANGE SUMMARY

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
(U) FY 1999 President's Budget:	8,563	8,862	8,780
(U) Appropriated Value:	8,563	8,862	
(U) Adjustments from President's Budget:	(518)	(387)	(210)
(U) FY 2000 President's Budget Submit:	8,045	8,475	8,570

CHANGE SUMMARY EXPLANATION:

(U) Funding: The FY 1998 decrease of \$518 thousand is due to the Small Business Innovation Research assessment of \$222 thousand; and a reduction of \$296 thousand for reprioritization of Navy requirements. FY1999 reduction of \$387 thousand was due to Congressional undistributed reductions. The FY 2000 decrease of \$210 thousand was due to pricing adjustments.

(U) Schedule: EO+ slippage due to Contractor's relocation from California to Illinois.

(U) Technical: Not Applicable

(U) C. OTHER PROGRAM FUNDING SUMMARY:

	<u>FY 1998</u> <u>Budget</u>	<u>FY 1999</u> <u>Budget</u>	<u>FY 2000</u> <u>Estimate</u>	<u>FY 2001</u> <u>Estimate</u>	<u>FY 2002</u> <u>Estimate</u>	<u>FY 2003</u> <u>Estimate</u>	<u>FY 2004</u> <u>Estimate</u>	<u>FY 2005</u> <u>Estimate</u>	<u>To</u> <u>Complete</u> <u>Cont</u>
(U) APN-7 (47C2)	88,075	95,883	118,310	100,855	112,211	106,605	107,349	102,832	

Related RDT&E:

(U) N/A

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205633N

PROGRAM ELEMENT TITLE: AVIATION IMPROVEMENTS

PROJECT NUMBER: W0852

PROJECT TITLE: Consolidated Automated Support System

(U) D. ACQUISITION STRATEGY: The strategy for Parts Obsolescence is a combined effort with the contractor, any changes to pre sent strategy will add additional risks to achieving a continuous production schedule and will cause technical uncertainty. For new technologies we will have competitive studies to ascertain the market technology, which will result in maximum information for minimum expenditure.

(U) E. SCHEDULE PROFILE

(U) Program Milestones

(U) Engineering Milestones

(U) T&E Milestones

(U) Contract Milestones

FY 1998 FY 1999 FY 2000 To Complete

III 12/98 EO+

EO+ FOT&E OT-IIIIB 6/99

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Exhibit R-2a, RDT&E Project Justification
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EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

DATE: Feb 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205633N

PROJECT NUMBER: W0852
PROJECT TITLE: Consolidated Automated Support System

<u>Cost Categories:</u>		Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	Cost to Complete	Total Cost
Pre-Planned Product Improvement (P3I)		FPI	TBD	835,000	225	4/99	1805	3/00	Cont	Cont
P3I		FPI	LMC	12,234	6000	1/99	4000	1/00	Cont	Cont
P3I		WX	NAWC-AD-LKE	15,539	750	12/98	1265	12/99	Cont	Cont
P3I		WX	NAWC-AD-PAX	510,200	550	12/98	750	12/99	Cont	Cont
Award Fees		N/A								
Subtotal Product Development				1,372,973	7525		7820		Cont	Cont
Remarks:										
Misc		MIPR	Gov		857	1/99	750	1/00	Cont	Cont
Subtotal Support					857		750		Cont	Cont
Remarks:										
Subtotal Test & Evaluation				0	0		0		0	0
Remarks:										
Subtotal Management SBIR Assessment				0	0		0		0	0
Remarks:					93					
Total Cost				1,372,973	8475		8570		CONT	CONT

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205633N

PROGRAM ELEMENT TITLE: AVIATION IMPROVMENTS

PROJECT NUMBER: W1041

**PROJECT TITLE: AIRCRAFT EQUIPMENT
RELIABILITY /MAINTAINABILITY IMPROVEMENT
PROGRAM (AERMIP)**

(U) COST: (Dollars in Thousands)

<u>Project Number & Title</u>	<u>FY 1998 Budget</u>	<u>FY 1999 Budget</u>	<u>FY 2000 Estimate</u>	<u>FY 2001 Estimate</u>	<u>FY 2002 Estimate</u>	<u>FY 2003 Estimate</u>	<u>FY 2004 Estimate</u>	<u>FY 2005 Estimate</u>	<u>To Complete</u>	<u>Total Program</u>
W1041 (AERMIP)	1,377	1,315	899	769	672	677	700	719	CONT	CONT
TOTAL	1,377	1,315	899	769	672	677	700	719	CONT	CONT
Quantity of RDT&E Articles										

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: AERMIP is the only Navy program which provides Research, Development, Test & Evaluation (RDT&E) engineering support specifically for in-service, out-of-production aircraft equipment. AERMIP increases readiness through Reliability and Maintainability (R&M) and safety improvements to existing systems and equipments installed in Naval aircraft. It meets affordable readiness objectives by providing a cost effective solution to obsolescence problems encountered when service lives are extended, and promotes commonality and standardization across aircraft platform lines and among the services through extension of application and use of non-developmental items. AERMIP also decreases life cycle costs through reduced operational and support costs. AERMIP facilitates the Operational, Safety, and Improvement Program by applying proven low-risk solutions to current fleet problems. AERMIP also funds high priority flight testing which is not associated with any acquisition or development program under the Flight Test General (FTG) task.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1998 ACCOMPLISHMENTS:

- (U) (\$1377) Completed Replacement of Altitude Heading Reference System (AHRS) and S-3B SKYFLEX Evaluation. Continued multi-platform SKYFLEX evaluation, E2/C2 Cowling latch replacement, and initiated Multi-place Life Raft improvement program. Significantly improve identification, analysis, and evaluation of AERMIP candidates via use of Logistics Management Decision Support System (LMDSS).

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205633N

PROGRAM ELEMENT TITLE: AVIATION IMPROVMENTS

PROJECT NUMBER: W1041

PROJECT TITLE: AIRCRAFT EQUIPMENT
RELIABILITY /MAINTAINABILITY IMPROVEMENT
PROGRAM (AERMIP)

2. FY 1999 PLAN:

- (U) (\$1310) Complete E2/C2 Cowling Latch. Continue SKYFLEX evaluation, Multi-Place Life Raft Improvement Program, Airborne Air Removal Device program and extend Replacement Attitude Heading Reference System (RAHRS) application to the H53E. Initiate MD-1 Gyroscope Improvement program. Investigate high value payback return on investment candidates.
- (U) (\$5) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. FY 2000 PLAN:

- (U) (\$899) Complete multi-platform application of SKYFLEX and Airborne Air Removal Device, and Multi-Place Life Raft Improvement Program. Continue with the extension of application of the RAHRS for the H53E. Initiate AN/ARC-161 Improvement Program. Investigate high value pay back return on investment candidates.

(U) B. PROGRAM CHANGE SUMMARY

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
(U) FY 1999 President's Budget:	1,424	1,351	919
(U) Appropriated Value:	1,424	1,351	
(U) Adjustments from Pres Budget:	-47	-36	-20
(U) FY 2000 President's Budget Submit:	1,377	1,315	899

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205633N

PROGRAM ELEMENT TITLE: AVIATION IMPROVMENTS

PROJECT NUMBER: W1041

PROJECT TITLE: AIRCRAFT EQUIPMENT
RELIABILITY /MAINTAINABILITY IMPROVEMENT
PROGRAM (AERMIP)

CHANGE SUMMARY EXPLANATION:

(U) Funding: FY-98 reflects a net decrease of -\$47 thousand which includes a -\$31 thousand reduction for the SBIR assessment and -\$16 thousand reduction for a minor reprogramming action. The net decrease of -\$36 thousand in FY-99 represents a -\$30 thousand reduction as a Congressional adjustment, -\$3 thousand reduction for civilian personnel adjustment, and -\$3 thousand reduction as an economic adjustment. The net decrease of -\$20 thousand in FY 2000 represents a -\$18 thousand reduction for rate adjustments and a -\$2 thousand for a minor reprogramming action.

(U) Schedule: Not Applicable

(U) Technical: Not Applicable

(U) C. OTHER PROGRAM FUNDING SUMMARY: Not applicable

(U) D. ACQUISITION STRATEGY: This is a non-ACAT program with no specific acquisition strategies.

(U) E. SCHEDULE PROFILE: Not applicable

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EXHIBIT R-2a, FY 2000 RDT&E, N BUDGET PROJECT JUSTIFICATION SHEET

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205633N

PROJECT NUMBER: W1355

PROGRAM ELEMENT TITLE: AVIATION IMPROVEMENTS

PROJECT TITLE: AIRCRAFT ENGINE CIP

(U) COST: (Dollars in Thousands)

<u>Project Number & Title</u>	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>To</u>	<u>Total</u>
	<u>Budget</u>	<u>Budget</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Complete</u>	<u>Program</u>
W1355 Aircraft Engine CIP										
	35,388	46,167*	39,714	47,526	41,628	37,373	73,135	84,162	CONT.	CONT.
TOTAL										

Quantity of RDT&E Articles: Not applicable

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Aircraft Engine CIP provides the only source of critical design and development engineering support to resolve safety, reliability and maintainability deficiencies of in-service Navy aircraft propulsion systems. The highest priority issues CIP addresses concern safety-of-flight deficiencies which account for approximately 80% of CIP efforts. The program also corrects service-revealed deficiencies, improves Operational Readiness (OR) and Reliability and Maintainability (R&M), and reduces platform Life Cycle Cost (LCC). Budgets are allocated across platform-specific teams and multi-platform product support teams based upon long term strategies to achieve safety and affordable readiness goals; the R-3 exhibit details annual portions of those long-term plans. CIP tasks have reduced the rate of in-flight aborts, safety incidents, non-mission capable rates, scheduled and unscheduled engine removals, maintenance work hours, and overall cost of ownership. This is accomplished through the maintenance and validation of specification performance, testing to qualify engineering changes, verifying life limits, and improving the inherent reliability of the propulsion system as an integral part of Reliability Centered Maintenance (RCM) initiatives. Historically, the missions, tactics, and environmental exposure of military aircraft systems change to meet new threats or operational demands, and often result in unforeseen problems, which if not corrected, can cause critical safety/readiness degradation, such as those experienced during DESERT SHIELD/DESERT STORM operations due to sand erosion. In addition, new problems arise through actual use during deployment of the aircraft. Development programs, while geared to resolve as many problems as possible before deployment, cannot duplicate actual operations or account for the vast array of environmental and usage variables, particularly when aircraft missions vary from those the aircraft was designed to perform. Therefore, it has been found that CIP can provide an immediate engineering response to these flight-critical problems and accelerated engine testing can avoid potential problems. CIP starts after development and Navy acceptance of the first production article and addresses usage and life problems not covered by warranties. CIP addresses engines, transmissions, propellers, starters, auxiliary power units, electrical generating systems, and fuel and lubricant systems. CIP efforts continue over the system's life, gradually decreasing to a minimum level sufficient to maintain the reliability, and decrease the operating costs, of older inventory. CIP is a highly leveraged and cooperative tri-service program with Foreign Military Sales participation.

*FY-99 budget includes a Congressional add of \$2,000K for Eddy Current Sensors executed under project W2663.

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0205633N

PROJECT NUMBER: W1355
PROJECT TITLE: AIRCRAFT ENGINE CIP

PROGRAM ELEMENT TITLE: AVIATION IMPROVEMENTS

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1998 ACCOMPLISHMENTS:

- (U) (\$32,095) Platform-specific efforts.
- T56 engine (P-3, E-2, C-2, C-130) Improved the maintenance plan, qualified alternative sources of parts, completed fuel nozzle redesign, continued propeller integration efforts to reduce Non Mission Capable rates, evaluated USAF JP-8 fuel additives.
- E-2/C-2/C-130 Identified propeller assembly fatigue failures and implemented inspection procedures in the Fleet to eliminate risk, increased electrical capacity and performance; eliminated starter failures; continued propeller redesign efforts, investigated cause of hot section damage, began generator improvement efforts.
- S-3 Continued efforts to reduce the number of bare firewalls, completed mission analysis, continued resolution of single engine rate of climb issues, developed field hardware inspection plan.
- F/A-18C/D Redesign F404 flameholder configuration which will result in lower operating costs; resolved in-flight engine shut downs (a top safety concern of the F-18 Systems Safety Working Group) by designing tantalum-tantalum capacitors for circuit boards of the engine control; continued efforts to redesign aft cooling plate, low pressure turbine nozzle, and fan stage 3 shroud, conducted life management issues including the fleet leader program, engine analysis studies and improved analytical models.
- F-14A Implemented Service Repair Development which incorporated state of the art maintenance changes which simplified tasks and reduced cost while improving safety and reliability. Addressed the top two reasons for unscheduled engine removals, sustaining engineering efforts and new problem resolution.
- F-14B/D Continued analysis of safety of flight issues including second stage compressor failure, mission analysis/life management critical engine rotating and accessory parts; analyzed and determined cause of variable stator vane failure.
- Mature Aircraft (EA-6B, T-2) Addressed the top four readiness degraders, the top two Aviation Depot Level Repairable (AVDLR) costs, troubleshooting procedures, and electrical system reliability and durability.
- H-2/H-60 Analyzed flameout and rollback safety issues, analyzed life management issues affecting safety and affordability, investigated and diagnosed Hydro-mechanical Unit and Engine Control Unit rejections off-wing and power take-off shaft wear anomalies. Established Mission Profile Data Collection and Dynamic Component Life Limit efforts.
- AV-8B Addressed top safety of flight issues including the LPC 2/3 Spacer, F402-RR-406 deficient refinery process, engine removal drivers, mission failure drivers and digital engine control unit. Redesign LPC 2/3 spacer component, researched, tested, defined, and rectified the deficient refinery process and returned the -406 Fleet to operation and deployable status.
- H-53/H-46/H-3 Performed life management analysis on Auxiliary Power Unit uncontained compressor wheel failures which resulted in updated life limits, rotating hardware redesigns, spin pit design validation testing and a risk mitigating implementation plan, performed Reliability Centered Maintenance analysis to baseline the material condition of engine hardware.

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205633N

PROGRAM ELEMENT TITLE: AVIATION IMPROVEMENTS

PROJECT NUMBER: W1355

PROJECT TITLE: AIRCRAFT ENGINE CIP

1. FY 1998 ACCOMPLISHMENTS: (CONT)

- H-1 Responded to and evaluated AH-1W flameout issues, Class A UH-1N mishap, Class C UH-1N mishap control purchasing issues, UH-1N tail rotor drive system, and AH-1W and UH-1N battery and starter issues. Analyzed and conducted testing on improved tail rotor drive system available on the Bell Model 412 to alleviate a "Top Ten" safety concern as ranked by the OAG and a "Top Three" safety concern as ranked by Navy UH-1N System Safety Working Group.
- T-45 Completed second year efforts on a four year engine surge recovery program. Provided inlet compatibility wind tunnel tests and conducted investigations. Addressed reliability issues including hi-pressure turbine nozzle guide vane thermal distress and high pressure compressor stator failures.
- (U) (\$3,293) Multi-Platform Product Support Completed engineering improvements for F-14 and S-3 compatible Constant Speed Drive-Integrated Drive Generator. Completed several battery improvement projects and introduced Sealed Lead-Acid aircraft batteries which increased the maintenance interval of vented lead-acid technology from 30-90 days up to 30 months on F/A-18, F-117, and H-46 aircraft. Implemented improved battery vents caps which double the maintenance intervals of vented nickel-cadmium batteries in the Fleet. Completed qualification and test flying of two sizes of Low Maintenance Flooded vented nickel-cadmium batteries which will increase the on-wing of nickel-cadmium batteries from 56-112 days to a minimum of one year. Improved power circuit protection, identified new circuit breakers which will identify breaks in insulation when they occur and aided in the identification of problem wiring prior to aircraft damage. This early identification will reduce wiring repair costs and realize a major safety improvement. Developed and maintained a broad qualified products list which assures product availability, maximum competition and minimum price. Evaluated numerous new corrosion inhibited turbine engine lubricants. Performed investigation on the +100 fuel additive developed by the USAF.

2. FY 1999 PLAN:

- (U) (\$37,738) Platform-specific efforts.
- T56 engine (P-3, E-2, C-2, C-130) Continue propeller integration efforts with potential propeller designs, perform engine hot section corrosion and fatigue analysis, and initiate bearing improvements.
- E-2/C-2/C-130 Continue propeller improvement program, eliminate starter failures, continue generator improvement program to triple durability.
- S-3 quality lube system design improvements, conduct control system reliability and maintainability analysis, validate and implement recommended part life changes. Complete resolution of single engine rate of climb issues. Minimize number of bare firewalls.

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: FEBRUARY 1999

PROJECT NUMBER: W1355
PROJECT TITLE: AIRCRAFT ENGINE CIP

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0205633N
PROGRAM ELEMENT TITLE: AVIATION IMPROVEMENTS

2. FY 1999 PLAN: (CONT)

- F/A-18C/D Continue efforts on aft cooling plate, low pressure turbine nozzle and fan stage 3 shroud redesigns. Continue life management issues including the fleet leader program, engine analysis studies, and improved analytical models, analyze engine performance data and update mission analysis.
- Mature Aircraft Address the top readiness degraders and AVDLR costs; perform an Accelerated Simulated Mission Endurance Test on the J52 engine (EA-6B), correct deficiencies in #3 hub, study "tired iron" issues and identify future obsolescence problems.
- H-2/H-60 Introduce the improved Digital Electronic Control Unit (DCU) to the H-60 fleet, develop I-level screening techniques for the DECU and Hydro-Mechanical units, continue the Advanced Helicopter Transmission Lubricant Program, extend transmission component lives, increase readiness by reducing corrosion, continue Mission Profile Data Collection and Dynamic Component Life Limit efforts.
- AV-8B Continue efforts to address safety of flight issues, engine removal drivers, and mission failure drivers. Continue efforts on digital engine control unit; resolve power lever actuator vibration problem
- H-53/H-46/H-3 Perform analysis on the top cause for engine removals; transition program to reliability-centered maintenance; create depot goals to improve compressor performance and engine power, resolve oil consumption and leakage problems, and improve on wing times.
- H-1 Continue improvements to tail rotor drive system. Investigate primary safety issues; flameouts and rollbacks.
- T-45 Implement third year of the four year engine surge recovery program, address platform safety, specification compliance, mission profile updates, and life cycle management.
- F-14A Perform minimal level of sustaining engineering.
- F-14B/D Improve propulsion system safety through an active life management program for critical rotating components, reduce the engine Non-recoverable In-Flight Shutdown Rate by 75% by 2003, reduce the propulsion system related mission abort rate by 50% by 2003.
- F/A-18E/F and V-22 Initiate CIP programs addressing propulsion systems such as electrical and fuel systems not covered by Power by the Hour programs and other support programs with the exception of fuel system, fuel pump, and engine fuel controller analysis on the F-18E/F and the Nacelle blower fan bearing, drive system chip detector, and drive shaft engine analysis on the V-22..
- (U) (\$7,682) Multi-Platform Product Support Teams Initiate projects designed to provide common support to multiple platforms in the areas of improved drive systems, secondary power and mechanical systems; improved tools for performance analysis, modeling and simulation, diagnostics, engine reliability assessment, and structural integrity; improved products and processes for fuels, lubricants, and refueling equipment; improved blade and vane repair processes and life cycle support; and improved electrical system product support and battery systems. Conduct study and analysis of Eddy Current Sensors.
- (U) (\$747) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205633N

PROJECT NUMBER: W1355

PROGRAM ELEMENT TITLE: AVIATION IMPROVEMENTS

PROJECT TITLE: AIRCRAFT ENGINE CIP

3. FY 2000 PLAN:

- (U) (\$35,345) Platform-specific efforts.
- T56 engine (P-3, E-2, C-2, C-130) Maintain safety margins by investigating turbine coatings and develop new designs, continue propeller integration efforts with potential propeller designs, perform engine hot section corrosion and fatigue analysis, and continue bearing improvements.
- E-2/C-2/C-130 Continue propeller safety improvement program, initiate pump housing improvement, perform Hub Internal Supply System development, eliminate starter failures, continue generator improvement program to triple durability.
- S-3 Establish and implement an engineering plan to improve TF34 reliability, perform analysis to obtain better performance from existing hardware, redesign low reliability parts, conduct control system reliability and maintainability analysis, validate and implement recommended part life changes.
- F/A-18C/D Identify obsolescence problems, continue efforts on aft cooling plate, low pressure turbine nozzle and fan stage 3 shroud redesigns. Continue life management issues including the fleet leader program, engine analysis studies, and improved analytical models, analyze engine performance data and update mission analysis.
- Mature Aircraft Address the top readiness degraders and AVDLR costs; implement efforts on the J52 engine (EA-6B) ASMET test, correct deficiencies in #3 hub, continue to study and implement solutions to "tired iron" issues and future obsolescence problems.
- H-2/H-60 Implement I-level screening techniques for the DECU and Hydro-Mechanical units, continue the Advanced Helicopter Transmission Lubricant Program, extend transmission component lives, increase readiness by reducing corrosion, continue Mission Profile Data Collection and Dynamic Component Life Limit efforts.
- AV-8B Address top readiness degraders and AVDLR costs; safety of flight issues, engine removal drivers, and mission failure drivers, assess life management program issues for engine components.
- H-53/H-46/H-3 Continue efforts on the top cause for engine removals; complete transition of program to reliability-centered maintenance; implement goals at depot level to improve compressor performance and engine power, resolve oil consumption and leakage problems, and improve on wing times.
- H-1 Address top safety concerns as ranked by the OAG and System Safety Working Group, update Navy maintenance manuals, continue to improve time-between-overhaul and reduce impact of high-time parts, continue improvements on tail rotor drive system.
- T-45 Complete four year engine surge recovery program, address platform safety, increase predicted part life confidence, provide mission profile updates and life cycle management.
- F-14A Perform minimal level of sustaining engineering to address safety-of-flight issues.
- F-14B/D Address extension of component life and the reduction of maintenance hours, improve propulsion system safety through an active life management program for critical rotating components, reduce the engine Non-recoverable In-Flight Shutdown Rate by 75% by 2003, reduce the propulsion system related mission abort rate by 50% by 2003.

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205633N
PROGRAM ELEMENT TITLE: AVIATION IMPROVEMENTS

PROJECT NUMBER: W1355
PROJECT TITLE: AIRCRAFT ENGINE CIP

3. FY 2000 PLAN: (CONT)

- F/A-18E/F and V-22 Continue initiation of CIP programs addressing propulsion systems such as electrical and fuel systems not covered by Power by the Hour programs and other support programs. Address durability improvements identified during qualification testing, continue the life cycle management program, continue "lead the fleet" testing to identify potential deficiencies prior to manifestation in fleet.
- (U) (\$4,369) Multi-Platform Product Support Teams Continue projects designed to provide common support to multiple platforms in the areas of improved drive systems, secondary power and mechanical systems; improved tools for performance analysis, modeling and simulation, diagnostics, engine reliability assessment, and structural integrity; improved products and processes for fuels, lubricants, and refueling equipment; improved blade and vane repair processes and life cycle support; and improved electrical system product support and battery systems.

(U) B. PROGRAM CHANGE SUMMARY

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
(U) FY 1999 President's Budget:	36,484	48,402	52,439
(U) Appropriated Value:	37,607	48,402	
(U) Adjustments from President's Budget:	-1,096	-2,235	-12,725
(U) FY 2000 President's Budget:	35,388	46,167	39,714

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205633N

PROGRAM ELEMENT TITLE: AVIATION IMPROVEMENTS

PROJECT NUMBER: W1355

PROJECT TITLE: AIRCRAFT ENGINE CIP

CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 1998 decrease reflects -\$1,065 thousand reduction for Small Business Innovation Research assessment and a -\$31 thousand reduction for minor balancing adjustments. FY 1999 decrease reflects a -\$1,000 thousand reduction for VECTOR offsets, a -\$3,000 thousand Congressional reduction to limit growth, a \$2,000 thousand Congressional increase for Eddy Current Sensors, a -\$109 thousand Congressional reduction for revised economic assumptions, and a -\$126 thousand reduction for balancing and rate adjustments. FY2000 decrease reflects a -\$12,000 thousand reduction to the overall Aircraft Engine CIP program, a -\$627 thousand reduction for rate adjustments, and a -\$98 thousand reduction for minor reprogrammings.

(U) Schedule: Postponement of ASMET test for the F-18 aircraft and deferment of Lead the Fleet efforts including analytical condition inspections, service evaluations, and threshold sampling. Reduce scope of FY99 H-1 efforts to eliminate analysis of top readiness degraders and high-time parts which support goal of improving time-between-overhaul; defer portion of tail rotor drive system improvements with completion of effort in FY02 versus FY01. F-18 E/F and V-22 CIP efforts to address propulsion system integration issues uncovered during the flight test programs and establish methodologies for core program metrics will be delayed. Impact on Reliability and Maintainability efforts such as deferment of plans for product improvements, designs to increase time on wing, reduce mean time between failure, and reduce operating and support costs.

(U) Technical: Increase aircraft flight safety risk for the F-18 E/F and V-22 during Op Eval. Increase overall production retrofit costs for needed improvements. Cannot expand evaluation and verifications of redesigns due to deferment of test and delays and elimination of R&M projects. Cannot fully explore affordable readiness or properly document lessons learned and realize reliability growth.

(U) C. OTHER PROGRAM FUNDING SUMMARY: Not applicable.

Related RDT&E

(U) P.E. 0203752A (Aircraft Engine CIP Army)

(U) P.E. 0207268F (Aircraft Engine CIP Air Force)

(U) P.E. 0603217N (Aircraft System Advance Tech. Dev.)

(U) D. ACQUISITION STRATEGY: Not applicable

(U) E. SCHEDULE PROFILE: Not Applicable

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February 1999

EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

DATE:

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205633N

PROJECT NUMBER: W1355
PROJECT TITLE: AIRCRAFT ENGINE CIP

Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999		FY 2000 Cost	FY 2000 Award Date	Cost to Complete	Total Cost	Target Value of Contract
			Cost	Award Date					

Cost Categories:

PRODUCT DEVELOPMENT

MAJOR EFFORTS (\$1.0M OR MORE)

F110 Engine Program GE F3365795C0055 Award Fees	SS/CPAF	Ohio	8,186	2,200 (220)	12/98	2,400 (240)	12/99	CONT.	CONT.	
F402 ENGINE PROGRAM N0001996C0172 RR Award Fees N0001996C0134 UK	SS/CPAF SS/CPFF SS/CPFF	BRISTOL ENG BRISTOL ENG	6,153 5,497	2,000 (160) 1,990	1/99 1/99	1,805 (144) 1,750	12/99 12/99	CONT. CONT.	CONT. CONT.	
F404/T58/T64 ENGINE PROGRAM N0001998C0007 GE N0001998C0054 GE	SS/CPFF SS/CPFF	LYNN MA LYNN MA	5,333 0	6,500 2,300	10/98 10/98	5,640 1,400	10/99 10/99	CONT. CONT.	CONT. CONT.	
J52 ENGINE PROGRAM N0001998C0054 P&W	SS/CPFF	FL	1,901	2,010	11/98	2,800	11/99	CONT.	CONT.	
T56 ENGINE NEW CONTRACT TBD ALLISON	SS/CPFF	INDIANA	0	1,670	1/99	1,905	1/00	CONT.	CONT.	
F405 ENGINE PROGRAM N0001997C0112 RR Award Fees	SS/CPAF	BRISTOL ENG	1,900	1,440 (115)	1/99	1,204 (96)	12/99	CONT.	CONT.	
F/A 18 E/F PROPULSION PROGRAM NEW CONTRACT TBD GE	SS/CPFF	LYNN MA	0	1,000	3/99	1,620	10/99	CONT.	CONT.	

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DATE: February 1999

EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

PROJECT NUMBER: W1355
PROJECT TITLE: AIRCRAFT ENGINE CIP

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205633N

Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999		FY 2000		Total Cost	Target Value of Contract
			Cost	Award Date	Cost	Award Date		

T700 ENGINE PROGRAM DAAJ0997C0131 GE	LYNN MA	1,092	1,000	12/98	1,000	12/99	CONT.	CONT.
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TF34 ENGINE PROGRAM F1460895C1461 GE	LYNN MA	2,420	700	10/98	720	10/99	CONT.	CONT.
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V22 PROPULSION PROGRAM NAVAIR CONTRACT GE TBD	LYNN MA	0	1,000	3/99	1,267	12/99	CONT.	CONT.
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PROPS PROGRAM NAVAIR CONTRACT HAM STANDARD		0	2,895	11/98	1,500	10/99	CONT.	CONT.
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CONTRACTS UNDER \$1.0M . AGGREGATE TOTAL	VARIOUS	9,159	2,000	10/98	500	10/99	CONT.	CONT.
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LAB/FIELD ACTIVITY (\$1.0M OR MORE)	WX NAWCAD PAX	60,650	14,023	10/98	12,129	10/99	CONT.	CONT.
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OTHER IN HOUSE SUPT <\$1.0M	VARIOUS	11,946	1,130	10/98	780	10/99	CONT.	CONT.
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GFP FUEL MD INCREMENTAL		2,885	460	10/98	350	10/99	CONT.	CONT.
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Subtotal Project Development		117,122	44,318		38,770		CONT.	CONT.
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Remarks
Percent of award fee that was actually awarded in PY was 97%.

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EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205633N

PROJECT NUMBER: W1355
PROJECT TITLE: AIRCRAFT ENGINE CIP

Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999		FY 2000		FY 2000 Award Date	Cost to Complete	Total Cost	Target Value of Contract
			Cost	Date	Cost	Date				

SUPPORT
OTHER IN HOUSE SUPPORT <\$1.0M

Subtotal Support

Remarks

TEST AND EVALUATION

OTHER IN HOUSE <\$1.0M
AGGREGATE TOTAL

Subtotal Test & Evaluation

Remarks

MANAGEMENT
OTHER IN HOUSE <\$1.0M

Subtotal Management

Remarks

SBIR Assessment

Total Cost

747

121,013 46,167 39,714

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EXHIBIT R-2, FY 2000 PRESIDENT'S BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 07

PROGRAM ELEMENT: 0205667N

PROJECT NUMBER: E1408

PROGRAM ELEMENT TITLE: F-14 Upgrade

PROJECT TITLE: F-14 Upgrade

(U) COST: (Dollars in Thousands)

<u>Project Number & Title</u>	<u>FY 1998 Budget</u>	<u>FY 1999 Budget</u>	<u>FY 2000 Estimate</u>	<u>FY 2001 Estimate</u>	<u>FY 2002 Estimate</u>	<u>FY 2003 Estimate</u>	<u>FY 2004 Estimate</u>	<u>FY 2005 Estimate</u>	<u>To Complete</u>	<u>Total Program</u>
E1408 F-14 UPGRADE	11,116	12,834	1,390	1,472	1,556	1,650	1,699	1,744	0	1,838,365
TOTAL										

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This program element provides for the development of improvements to the Navy F-14 squadrons in order to counter the projected threat through the year 2000 and beyond. The F-14D has increased capability in three major areas: new engine, new digital avionics, and upgraded radar. These changes yield significant improvements in capability and performance, as well as reliability and maintainability, and will facilitate the total integration and exploitation of related programs i.e., Joint Tactical Information Distribution System (JTIDS), Infrared Search and Track System (IRST), and inclusion of Airborne Self-Protection Jammer (ASPJ) in the electronic warfare (EW) suite for the F-14D operational evaluation. A Pre-deployment Update (PDU) program (primarily software) includes air-to-ground ordnance delivery capability, full Link 16 capability, and radar/Electronic Counter-Countermeasures (ECCM) improvements for the F-14D. The PDU program was created because of concurrent development of the F-14D and the above listed common avionics and weapons. It implements the capabilities inherent in systems incorporated during the full scale development (FSD) program and is a planned integral part of the evolution of the F-14D aircraft. F-14 weapons integration supports integration of EW improvements and correction of OPEVAL deficiencies. Funding is also provided for various software upgrades such as Global Positioning System, and accommodates the realignment of Aviation Depot Level Repairables (AVDLR) from Major Range and Test Facility Bases to direct project funding.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it encompasses engineering and manufacturing development for upgrade of existing, operational systems.

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EXHIBIT R-2a, FY 2000 PRESIDENT'S BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 07

PROGRAM ELEMENT: 0205667N

PROJECT NUMBER: E1408

PROGRAM ELEMENT TITLE: F-14 Upgrade

PROJECT TITLE: F-14 Upgrade

(U) COST: (Dollars in Thousands)

<u>Project Number & Title</u>	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>To</u>
	<u>Budget</u>	<u>Budget</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Complete</u>
E1408 F-14 UPGRADE									
TOTAL	11,116	12,834	1,390	1,472	1,556	1,650	1,699	1,744	0
									1,838,365

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This program element provides for the development of improvements to the Navy F-14 squadrons in order to counter the projected threat through the year 2000 and beyond. The F-14D has increased capability in three major areas: new engine, new digital avionics, and upgraded radar. These changes yield significant improvements in capability and performance, as well as reliability and maintainability, and will facilitate the total integration and exploitation of related programs i.e., Joint Tactical Information Distribution System (JTIDS), Infrared Search and Track System (IRST), and inclusion of Airborne Self-Protection Jammer (ASPU) in the electronic warfare (EW) suite for the F-14D operational evaluation. A Pre-deployment Update (PDU) program (primarily software) includes air-to-ground ordnance delivery capability, full Link 16 capability, and radar/Electronic Counter-Countermeasures (ECCM) improvements for the F-14D. The PDU program was created because of concurrent development of the F-14D and the above listed common avionics and weapons. It implements the capabilities inherent in systems incorporated during the full scale development (FSD) program and is a planned integral part of the evolution of the F-14D aircraft. F-14 weapons integration supports integration of EW improvements and correction of OPEVAL deficiencies. Funding is also provided for various software upgrades such as Global Positioning System, and accommodates the realignment of Aviation Depot Level Repairables (AVDLR) from Major Range and Test Facility Bases to direct project funding.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it encompasses engineering and manufacturing development for upgrade of existing, operational systems.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1998 PLAN:
 - (\$11,116) Continue development and test of third PDU tape.

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EXHIBIT R-2a, FY 2000 PRESIDENT'S BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 07

PROGRAM ELEMENT: 0205667N

PROJECT NUMBER: E1408

PROGRAM ELEMENT TITLE: F-14 Upgrade

PROJECT TITLE: F-14 Upgrade

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

2. (U) FY 1999 PLAN:
 - (U) (\$12,834) Continue development and test of third PDU tape.
 - (U) (\$1) Portion of extramural program reserved for Small Business Innovation Research Assessment in accordance with 15 USC 638.
3. (U) FY 2000 PLAN:
 - (U) (\$1,390) Complete development and test of third PDU tape. Conduct operational evaluation.

B. (U) PROGRAM CHANGE SUMMARY:

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
(U) FY 1999 President's Budget:	11,289	12,947	1,415
(U) Appropriated Value:	11,133	12,947	
(U) Adjustments from President's Budget:	-173	-113	-23
(U) FY 2000 President's Budget Submit:	11,116	12,834	1,390

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding:

- (U) The FY1998 decrease of -\$173 thousand consists of -\$41 thousand for a Congressional adjustment and -\$132 thousand for an SBIR assessment.
- (U) The FY1999 decrease of -\$113 thousand consists of -\$30 thousand for an economic assessment, -\$37 thousand for a civilian personnel execution adjustment, and -\$46 thousand for a contract advisory and assistance services adjustment.
- (U) The FY 2000 decrease consists of +\$11 thousand for civilian pay rate adjustment, -\$20 thousand for inflation, and -\$14 thousand for a working capital fund adjustment.

(U) Schedule: (U) Tape D03B is now in FY 2000.

(U) Technical: N/A

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EXHIBIT R-2a, FY 2000 PRESIDENT'S BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 07 **PROGRAM ELEMENT: 0205667N** **PROJECT NUMBER: E1408**
PROGRAM ELEMENT TITLE: F-14 Upgrade **PROJECT TITLE: F-14 Upgrade**

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in millions)

APPN	FY 1998 ACTUAL	FY 1999 BUDGET	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE
APN-5	275.4	214.4	83.4	38.3	25.7	20.2	19.1	.1	0

(U) RELATED RDT&E:

- (U) PE 0205604N (Tactical Data Links)
- (U) PE 0604270N (EW Development)

D. (U) ACQUISITION STRATEGY: NOT APPLICABLE.

E. (U) SCHEDULE PROFILE:

TO COMPLETE

FY 2000

FY 1999

FY 1998

Program
Milestones

Engineering
Milestones

T&E
Milestones

Contract
Milestones

1Q/00 - 2Q/00
OT-III(Tape 3B)

3Q/97 - 1Q/98
OT-III(Tape 3A)

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DATE: February 1999

EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

PROJECT NUMBER: E1408
PROJECT TITLE: F14 UPGRD

PROGRAM ELEMENT: 0205667N

BUDGET ACTIVITY: 07

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999		FY 2000		Cost to Complete	Total Cost	Target Value of Contract
				Cost	Award Date	Cost	Award Date			
AMRAAM Int.	SS/CPFF	Northrop Grumman, Bethpage NY	9,924	0		0		0	9,924	9,924
BLK I/JDAM	SS/CPFF	Northrop Grumman	6,506	0		0		0	6,506	6,506
FSD Cont	SS/FFP	Bethpage, NY Northrop Grumman	994,378	0		0		0	994,378	994,378
PDU	WX	Bethpage, NY NAWC Pt. Mugu CA	208,241	12,328		0		0	220,569	
Miscellaneous - Contracts			3,154	0		0		0	3,154	3,154
Miscellaneous - In House			26,300	350		0		0	26,650	
Repair of Repairables	WX	Various	11,078	0		0		0	11,078	
Subtotal Product Development			1,259,581	12,678		0		0	1,272,259	

Remarks

Subtotal Support

Remarks

0 0 0 0 0 0 0 0 0 0 0

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DATE: February 1999

EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

PROJECT NUMBER: E1408
PROJECT TITLE: F14 UPRD

PROGRAM ELEMENT: 0205667N

BUDGET ACTIVITY: 7

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999		FY 2000		Cost to Complete	Total Cost	Target Value of Contract
				Cost	Date	Cost	Date			
PDU Systems Engineering/Test and Evaluation		NAWC Pt. Mugu CA	0	0		1,390		8,121	9,511	
COMOPTVFOR PD		PD COMOPTVFOR	3,760	0		0		0	3,760	
Subtotal Test & Evaluation			3,760	0		1,390		8,121	13,271	
Remarks										
Contractor Engineering Support	Various	wx	1,325	155		0		0	1,481	
Subtotal Management			1,325	155		0		0	1,481	
Other FY95 & Prior Costs			551,354						551,354	
SBIR Assessment					1					
Total Cost			1,816,020	12,834		1,390		8,121	1,838,365	

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February 1999
BUDGET ACTIVITY		PE NUMBER AND TITLE									
7 - Operational System Development		0206313M Marine Corps Communications Systems									
	COST (In Millions)	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
Total Program Element (PE) Cost		37828	53015	90293	83323	77623	64553	40462	33854	Continuing	Continuing
C2270 Command Post Systems		6027	10218	23109	23490	14966	11282	10471	10063	Continuing	Continuing
C2271 Maneuver C2 Systems		1486	2067	986	446	403	305	0	0	0	5693
C2272 Intelligence C2 Systems		2702	4348	12839	7831	8493	8264	5288	5459	Continuing	Continuing
C2273 Air Operations C2 Systems		4355	6289	16415	25747	23083	8612	6768	4094	Continuing	Continuing
C2274 C2 Warfare Systems		3384	3939	8387	3504	4374	5046	3213	3403	Continuing	Continuing
C2275 Radio Systems		3293	1733	0	0	0	0	0	0	0	5387
C2276 Communications Switching and Control System		1850	1888	1841	229	0	0	0	0	0	5808
C2277 Systems Engineering and Integration		1922	7155	6966	6762	6906	6624	6628	6466	Continuing	Continuing
C2278 Air Defense Weapons Systems		744	2001	9759	9350	9688	11537	2741	3618	Continuing	Continuing
C2315 Training Devices/Simulators		7203	9368	8850	4881	9021	12342	5093	491	Continuing	Continuing
C2500 Close Range UAV Data Links		4862	0	0	0	0	0	0	0	0	4692
C2510 MAGTF CSSE & SE		0	0	1141	1083	689	541	260	260	Continuing	Continuing
C2664 Joint Task Force Enhanced Communications		0	4009	0	0	0	0	0	0	0	0
Quantity of RDT&E Articles											
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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

February 1999

BUDGET ACTIVITY

7 - Operational System Development

PE NUMBER AND TITLE

0206313M Marine Corps Communications Systems

(U) **Mission Description and Budget Item Justification:** This program element provides funding to develop the command and control (C2) support and information infrastructures for the Fleet Marine Force and supporting establishment. Doctrinally, the C2 support system and the information infrastructure form two parts of a triad of capabilities which permits command and control systems to be transformed into a complete operating system. The third element of the triad is command and control organization and is not covered in this program element. USMC command and control is divided into six functional areas and one supporting functional area as follows: maneuver C2, intelligence C2, fire support C2, air operations C2, combat service support C2, warfare C2, and C2 support (information processing and communications). Within this program element, subprojects have been grouped by C2 functional area for more efficient planning. Air defense weapons systems have been added to facilitate planning and a separate project is used for systems assigned to the supporting establishment. Subprojects which support the commander's decision processes have been collected into the Command Post Systems project since these systems must work in close cooperation to ensure effective C2 of Marine Air Ground Task Forces. The Coastal Battlefield Reconnaissance and Analysis (COBRA) system is a passive multispectral sensor system capable of operating in a PIONEER unmanned aerial vehicle (UAV). Imagery recorded on the UAV or disseminated via data link is analyzed by the COBRA ground station. Ground station algorithm processing provides near real-time automatic minefield detection with Differential Global Positioning System (DGPS) location accuracy.

(U) **Justification for Budget Activity:** This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it encompasses engineering and manufacturing development for upgrade of existing, operational systems.

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Budget Item Justification

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE February 1999	
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT	
7 - Operational System Development		0206313M Marine Corps Communications Systems								C2270	
COST (In Millions)		FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
C2270 Command Post Systems		6027	10218	23109	23490	14966	11282	10471	10063	Continuing	Continuing
Quantity of RDT&E Articles											
<p>A. (U) Mission Description and Budget Item Justification: Systems assigned to this project are to be used by commanders and their staffs to process, fuse, and tailor information to assist decision-making and enhance situational awareness. They will integrate and share information from sources both internal and external to the Marine Air-Ground Task Force (MAGTF) to provide a shared understanding of the battlespace.</p> <ol style="list-style-type: none"> 1. Decision support integrates information from the seven Command and Control (C2) functional areas and the support function. The information is tailored to support the users' specific needs. As a result of the MAGTF C4I Baseline subproject, an integrated migration strategy is being incorporated into the MAGTF software baseline which will be common across and used by all MAGTF C4I programs. 2. The Tactical Command Operations (TCO) will provide systems to the command post which support Maneuver C2. Maneuver C2 is the executive layer of decision support that pulls and fuses information from other functional areas. 3. The Intelligence Analysis Systems (IAS) supports the employment of reconnaissance, surveillance, and target acquisition resources and the timely planning and processing of all-source intelligence; it ensures that tactical intelligence is tailored to meet specific mission requirements. A Marine Expeditionary Force (MEF) IAS variant will also process signals intelligence. 4. Advanced Field Artillery Tactical Data Systems (AFATDS) will consist of fire support command and control software fielded on Marine Corps common hardware. AFATDS will provide the MAGTF with an automated ability to rapidly integrate, all supporting arm assets into maneuver plans. 5. The Advanced Tactical Air Command Center (ATACC) functions as the operational command post of the MAGTF ACE. It provides automated assistance for planning and executing tactical air operations, and provides voice and data interface with joint and combined Air C2 agencies. The Phase I ATACC was fielded 1st Qtr FY96. The Improved Direct Air Support Center (IDASC) links information and systems needed to conduct Air Operations C2 with Maneuver C2 of the ground combat element of the MAGTF. 6. The Expeditionary Integrated Combat Operations Center (EICOC)/Unit Operations Center (UOC) project develops and transitions two Command and Control Imperative ATDs (the Expeditionary Integrated Combat Operations Center (EICOC) and the Joint Tactical Communications (JT COMM)s ATDs) into various Marine Corps and Joint Engineering and Manufacturing Development (E&MD) efforts. EICOC development efforts focus on: Cognitive Task Analysis (CTA); enhanced ergonomic physical design; evaluation of advanced multimedia hardware; integration and networking with advanced development communication 											

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Budget Item Justification

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 1999
BUDGET ACTIVITY		PE NUMBER AND TITLE	PROJECT
7 - Operational System Development		0206313M Marine Corps Communications Systems	C2270
<p>systems; and advanced software development to support systems integration and advanced battlefield visualization concepts. EICOC developments are tailored to support transition of software and hardware developments as PIPs to the established MAGTF C4I baseline. EICOC is the interim name for the Unit Ops Center (UOC). The UOC name will replace the EICOC name starting with FY00. Unit Operations Center (UOC) will provide a facility and components for the integration of current and planned battlefield automation systems. It will be, in essence a "system of systems" designed to optimize the positioning, interaction, and flow of information among the various staff agencies (G-2, G-3, Operations Directorate, etc.) and their automated information systems and between the unit and higher, adjacent or subordinate units or headquarters. The Marine corps deploys Component/Joint Task Force (JTF/Marine Air Ground Task Force (MAGTF)) command elements throughout the world to fulfill operational requirements, often in joint/combined forces arenas. The UOC is designed in garrison and tactical versions. The tactical version is called the Combat Operations Center (COC) which is an outgrowth of the integrated COC (ICOC), COC-Interim (COC(I)), and the Enhanced COC (ECOC) developments over the last two years. The garrison version is called the Command Center (CC).</p>			
<p>PROGRAM ACCOMPLISHMENTS AND PLANS:</p>			
<p>(U) FY 1998 Accomplishments:</p>			
(U) \$	200	TCO: Completed Phase III ORD requirements.	
(U) \$	0	TCO: Completed Phase III ORD requirements. (This effort forwarded financed with \$400 FY97 funds.)	
(U) \$	134	TCO: Initiated the integration of software and hardware changes into existing system and perform testing.	
(U) \$	517	TCO: Initiated the incorporation of Phase IV ORD requirements.	
(U) \$	70	TCO: Completed automatic relay message routing.	
(U) \$	152	IAS: Continued testing of new standard software applications.	
(U) \$	50	IAS: Continued interoperability testing with system hardware and software modifications.	
(U) \$	80	IAS: Initiated and tested prototype IAS Workstations.	
(U) \$	0	IAS: Initiated and tested prototype IAS Workstations. This effort financed with \$117K of FY 97 funds.	
(U) \$	257	IDASC: Investigated hardware ECPs for the HMD DASC system for improved digital communications capabilities and for computer hardware upgrades	
(U) \$	0	IDASC: Investigated hardware ECPs for the HMD DASC system for improved digital communications capabilities and for computer hardware upgrades. This effort financed with \$100K of FY 97 funds.	
(U) \$	229	IDASC: Incorporated and tested new standard software applications which will allow automated communication between the DASC and the fire support coordination center.	
(U) \$	60	IDASC: Conducted interoperability testing with system modifications to ensure that incorporated modifications will allow automated communications between USMC and joint command and control systems.	
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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

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BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

7 - Operational System Development

0206313M Marine Corps Communications

C2270

Systems

• (U) \$	331	IAS MOD: Initiated hardware ECPs for MEF IAS and IAS suites.
• (U) \$	150	IAS MOD: Follow-on testing of ECPs and program management support.
• (U) \$	747	MAGTF C4I Baseline: Continued software development of the MSBL developed to the DII COE. Includes enhanced open system, distributed directory services, distributed file service and enhanced security.
• (U) \$	448	MAGTF C4I Baseline: Continued software integration to the MSBL.
• (U) \$	298	MAGTF C4I Baseline: Continued developmental and battle lab testing of MSBL.
• (U) \$	304	EICOC/UOC: Began investigating GOTS/COTS software/hardware to support automation of Command Post Systems.
• (U) \$	309	EICOC/UOC: Began integration efforts of GOTS/COTS software/hardware into the Command Post System.
• (U) \$	148	EICOC/UOC: Began developmental testing of Command Post System.
• (U) \$	1502	AFATDS: Continued developmental and interoperability efforts with the Army on AFATDS 98 software. This effort will include migration to the DII COE, adding additional fire support functionality, continuing work on identifying a smaller computer for the USMC, preparing test units for a Multi-Service Limited Users Test of AFATDS 98, and in obtaining a Procurement Decision. Army achieves MSIII.
• (U) \$	0	AFATDS: Continued developmental and interoperability efforts with the Army on AFATDS 98 software. This effort will include migration to the DII COE, adding additional fire support functionality, continuing work on identifying a smaller computer for the USMC, preparing test units for a Multi-Service Limited Users Test of AFATDS 98, and in obtaining a Procurement Decision. This effort financed with \$612K of FY97 funds.
(U)\$	41	ATACC: Multiple Source Correlation System (MSCS) ECP 97012 for CTT3 integration
(U)Total \$	6,027	
(U) FY 1999 Planned Program:		
• (U) \$	1098	TCO: Initiate Phase IV ORD requirements.
• (U) \$	230	TCO: Integrate software changes into existing systems and perform testing.
• (U) \$	155	IAS: Investigate Hardware/Software interoperability issues in regards to Marine Corps C4I and Joint intelligence and operations systems.
• (U) \$	548	IAS: Begin development of intelligence applications into the CZPC software baseline.
• (U) \$	364	IDASC: Investigate hardware ECPs for the HMD DASC system for migration towards a common USMC Aviation Command and Control Communications System.
• (U) \$	242	IDASC: Continue testing new standard software applications. Continue interoperability testing with system modifications.
• (U) \$	231	IAS MOD: Continue investigation of hardware ECPs for MEF IAS and IAS Suites.

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Budget Item Justification

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)			DATE	February 1999
BUDGET ACTIVITY		PE NUMBER AND TITLE	PROJECT	
7 - Operational System Development		0206313M Marine Corps Communications Systems	C2270	
	• (U) \$ 168	IAS MOD: Continue program management for testing of ECPs.		
	• (U) \$ 424	MAGTF C4I BASELINE: Continue software development of the MSBL developed to the (DIICOE). Includes enhanced open system, distributed directory services, distributed file service, and enhanced security.		
	• (U) \$ 284	MAGTF C4I BASELINE: Continue software integration to the MSBL.		
	• (U) \$ 189	MAGTF C4I BASELINE: Continue developmental and battle lab testing of the MSBL.		
	• (U) \$ 784	MAGTF C4I BASELINE: Initiate the integration (system level) of Enhanced Position Location Reporting System (EPLRS) with MAGTF C4I tactical data systems.		
	• (U) \$ 245	MAGTF C4I BASELINE: Initiate the integration (network level) and fusion of EPLRS and MAGTF C4I tactical data systems into a seamless and integrated data network that provides command, control, and situational awareness data connectivity		
	• (U) \$ 867	MAGTF C4I BASELINE: Begin software development necessary to allow the integration of the Combat Operations Center Interim (COC(I)) into the MAGTF C4I software baseline.		
	• (U) \$ 375	EICOC/UOC: Continue investigating GOTS/COTS software/hardware to support automation of Command Post Systems.		
	• (U) \$ 478	EICOC/UOC: Continue integration efforts of GOTS/COTS software/hardware into the Command Post Systems.		
	• (U) \$ 313	EICOC/UOC: Continue developmental testing of Command Post System.		
	• (U) \$ 2291	AFATDS: Continue developmental and interoperability efforts with the Army on AFATDS 98 software. This effort will include migration to the DII COE), adding additional fire support functionality, continuing work on identifying a smaller computer for the USMC, preparing test units for a Multi-Service Limited Users Test of AFATDS 98, and in obtaining a Procurement Decision.		
	(U) \$ 775	TCAC PIP: M65 Multi land family and integration of CA & TN tools. Integration iwht Joint Signet Systems, complete the Signet analysis toolkit , matches integration		
	(U) \$ 157	SBIR: 157K portion of extramural program reserved for Small Businee Innovation Reserch assessment in accordance with 15 USC 638.		
	(U)Total \$ 10,218			
(U) FY 2000 Planned Program:				
	• (U) \$ 976	TCO: Begin incorporating Phase V ORD requirements.		
	• (U) \$ 417	TCO: Complete Phase IV ORD reqt. and Integrate software changes into existing system and perform testing. Complete Phase II ORD requirements.		
	• (U) \$ 400	TCAC: Develop software to maintain compatability with Signals Intelligence systems.		
	• (U) \$ 495	TCAC: Integrate signals intelligence correlator.		
	• (U) \$ 152	IAS MOD: Investigate MEF IAS system Performance enhancement.		
	• (U) \$ 53	IAS MOD: Conduct system software enhancement		
			R-1 Line Item 169	Budget Item Justification

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BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

7 - Operational System Development

0206313M Marine Corps Communications Systems

C2270

- (U) \$ 100 IAS MOD: Conduct system interoperability testing with Marine Corps and Joint systems to include: TCO, GCCS, ASAS, AFATDS, and other emerging systems as needed to ensure Marine Corps compatibility in the joint arena.
- (U) \$ 200 IAS MOD: Begin ECP documentation and integration.
- (U) \$ 249 IAS MOD: Continue C2PC Intel software development.
- (U) \$ 1000 MAGTF C4I BASELINE: Continue the development of improved software in order to maintain pace with the DII COE [GCCS (DISA) & GCCS-M (Navy)].
- (U) \$ 3283 MAGTF C4I BASELINE: Begin the migration of additional functionality segments (11) to the MSLB.
- (U) \$ 1802 MAGTF C4I BASELINE: Integration of new software with the systems and existing software.
- (U) \$ 1283 MAGTF C4I BASELINE: Continue the certification & security testing of new software to ensure interoperability (Battlelab) (GCCS-M version 3.2 & C2PC version 6.0).
- (U) \$ 450 MAGTF C4I BASELINE: Update/Improve the Requirements Traceability Matrix (RTM) & Revalidate the REVIC model estimates.
- (U) \$ 2273 AFATDS: Continue developmental and interoperability efforts with the Army on AFATDS 98 software. This effort will include migration to the DII COE), adding additional fire support functionality, continuing work on identifying a small computer for the USMC, preparing test units for a Multi-Service Limited Users Test of AFATDS 98, and in obtaining a Procurement Decision.
- (U) \$ 6984 UOC: Begin system engineering development, integration, and manufacture Engineering Development Models (EDMs).
- (U) \$ 997 UOC: Begin Tactical Data System (TDS) NT development, engineering, integration and manufacture.
- (U) \$ 1995 UOC: System testing and assessment.
- (U) Total \$ 23,109

B. (U) Project Change Summary

	FY 1998	FY 1999	FY 2000
(U) Previous President's Budget	7,067	9,778	10,430
(U) Adjustments to Previous President's Budget	-1,040	+440	+12,679
(U) Current Budget Submit	6,027	10,218	23,109

(U) Change Summary Explanation:

- (U) Funding: FY98: Internal reprogramming actions; \$988K, SBIR assessment in accordance with U.S.C. 638 (f) (1); \$133K.
- FY00: adjustments due to prioritization of program's within the Marine Corps and minor affordability adjustments.
- (U) Schedule: N/A
- (U) Technical: N/A

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BUDGET ACTIVITY

PE NUMBER AND TITLE

7 - Operational System Development

0206313M Marine Corps Communications Systems

PROJECT

C2270

	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost
C. (U) Other Program Funding Summary										
(APPN, BLI #, NOMEN)										
(U) PMC BLI# 463100 TCO	9349	1560	0	0	0	0	0	0	0	10909
(U) PMC BLI# 474700 IAS	9561	10153	0	0	0	0	0	0	0	19714
(U) PMC BLI# 463600 IDASC	3008	1402	0	0	0	0	0	0	0	4410
(U) PMC BLI# 474900 IAS MOD	1383	1658	1407	1445	1369	1379	1406	1419	CONT	CONT
(U) PMC BLI# 463100 AFATDS	0	3553	3074	2958	2341	0	480	2637	0	15043
(U) PMC BLI# 463100 UOC	0	0	0	0	17529	23704	48924	77403	CONT	CONT
(U) TCO (O&MMC)	447	169	707	728	554	570	582	595	CONT	CONT
(U) MEF IAS (O&MMC)	574	1529	1848	1761	0	0	0	0	CONT	CONT
(U) IDASC (O&MMC)	187	144	148	152	155	160	164	168	CONT	CONT
(U) AFATDS (O&MMC)	0	339	428	426	406	420	429	438	CONT	CONT
(U) TCAC (O&MMC)	0	1168	1313	1302	0	0	0	0	CONT	CONT
(U) MEWSS (O&MMC)	790	820	926	930	0	0	0	0	CONT	CONT

(U) Related RDT&E

(U) PE 0301301L (Department of Defense Intelligence and Information Systems/Military Intelligence Integrated Data System/Integrated Data Base I and II) (Defense Intelligence Agency).

(U) Navy Tactical Flag Communication and Control System.

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Budget Item Justification

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1999
BUDGET ACTIVITY 7 - Operational System Development	PE NUMBER AND TITLE 0206313M Marine Corps Communications Systems	PROJECT C2270

D. (U) Schedule Profile

IAS MEF Schedule:

IAS Program

		FY96				FY97				FY98				FY99				FY00			
		1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
MEF IAS Milestones	◆ MPT&E																				
	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 2px;">L</div> <div style="border: 1px solid black; padding: 2px;">A</div> <div style="border: 1px solid black; padding: 2px;">R</div> </div>																				
	◆ MS III Contract Awarded																				
Fielding	I MEF - 3 MCTSSA-1																				
	II MEF - 2 NMTC-1																				
	III MEF - 2 WAR RESERVE 0																				
IAS WORKSTATION (BNSQDN)																					
Milestones	◆ MS III																				
Fielding	161 Bn/Sqn																				
	132 MEF/MS/REGT																				
<div style="display: flex; align-items: center;"> <div style="margin-right: 10px;">Now At:</div> <div style="border: 1px solid black; padding: 5px;"> <div style="display: flex; justify-content: space-between;"> <div>11</div> <div>71</div> <div>71</div> <div>70</div> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <div>IOC</div> <div></div> <div></div> <div>FOC</div> </div> </div> <div style="margin-left: 10px;">↑</div> </div>																					

R-1 Line Item 169

Budget Item Justification

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1999
BUDGET ACTIVITY 7 - Operational System Development	PE NUMBER AND TITLE 0206313M Marine Corps Communications Systems	PROJECT C2270

IAS SUITE Schedule:

IAS Program

FY96	FY97	FY98	FY99	FY00
1Q 2Q 3Q 4Q	1Q 2Q 3Q 4Q	1Q 2Q 3Q 4Q	1Q 2Q 3Q 4Q	1Q 2Q 3Q 4Q
<div style="display: flex; justify-content: space-between;"> <div style="width: 20%;"> <p>IAS SUITE</p> <p>Milestones</p> <p>Helding</p> <p>Now At:</p> </div> <div style="width: 60%; text-align: center;"> <p>MSIII JAN 93</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>25</p> <p>♦ IOC</p> </div> <div style="text-align: center;"> <p>10</p> <p>♦</p> </div> <div style="text-align: center;"> <p>35</p> <p>♦ FOC</p> </div> </div> <div style="width: 15%; text-align: right;"> <p>I MEF - 19</p> <p>II MEF - 16</p> <p>III MEF - 11 RESERVES - 16</p> <p>SUPPORT ESTABLISHMENT - 8</p> </div> </div> </div>				

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Budget Item Justification

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UNCLASSIFIED

February 1999

BUDGET ACTIVITY

7 - Operational System Development

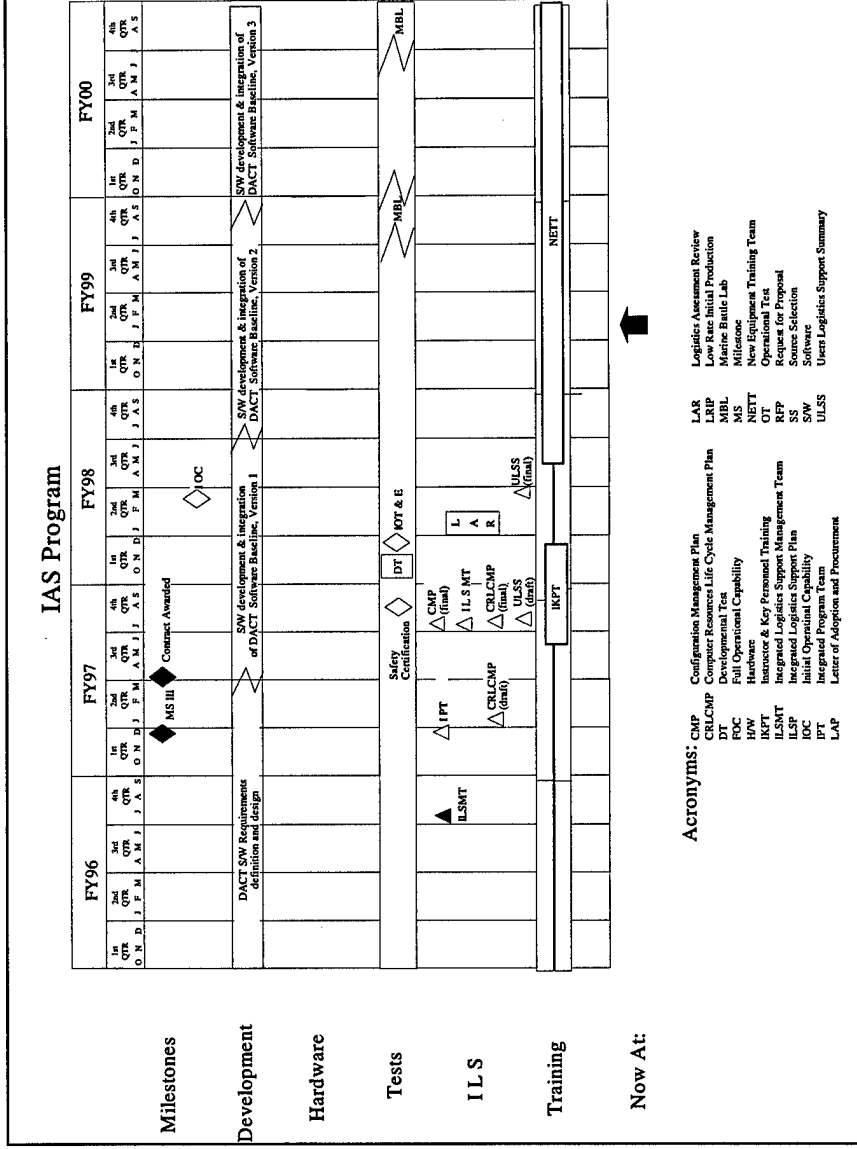
PE NUMBER AND TITLE

0206313M Marine Corps Communications Systems

PROJECT

C2270

IAS Program Schedule:




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Budget Item Justification

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1999
BUDGET ACTIVITY 7 - Operational System Development	PE NUMBER AND TITLE 0206313M Marine Corps Communications Systems	PROJECT C2270





Advanced Field Artillery Tactical Data System


SW MATERIAL RELEASE


FY 98				FY 99				FY 00				FY 01			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4


AFATDS 98
 **A98 LUT**

 **MATERIAL RELEASE**

AFATDS 99
 **A99 LUT**

 **MATERIAL RELEASE**

AFATDS 00
 **A00 LUT**

 **MATERIAL RELEASE**

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Budget Item Justification
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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1999
BUDGET ACTIVITY 7 - Operational System Development	PE NUMBER AND TITLE 0206313M Marine Corps Communications Systems	PROJECT C2270

TCO Schedule

TCO Program Structure

	FY98		FY99		FY00		FY01		FY02		FY03		FY04		FY05	
	1st QTR	2nd QTR	3rd QTR	4th QTR	1st QTR	2nd QTR	3rd QTR	4th QTR	1st QTR	2nd QTR	3rd QTR	4th QTR	1st QTR	2nd QTR	3rd QTR	4th QTR
Milestones	<div style="text-align: center;"> </div>															
Development	<div style="text-align: center;"> </div>															
Hardware	<div style="text-align: center;"> 54 <div style="display: flex; justify-content: space-between; width: 100%;"> 151 151 151 </div> </div>															
Tests	<div style="text-align: center;"> </div>															
ILS	<div style="text-align: center;"> </div>															
Training	<div style="text-align: center;"> </div>															

Acronyms:

ROC Full Operational Capability
 HWV Hardware
 ILSMT Integrated Logistics Support Management Team
 ILSP Integrated Logistics Support Plan
 IOC Initial Operational Capability
 LAP Letter of Adoption and Procurement
 LAR Logistics Assessment Review

MRL Marine Battle Lab
 MS Milestone
 OT Operational Test
 SW Software
 ULSS User Logistics Support Summary

Notes: Hardware systems in FY01-05 are replacement fieldings to be conducted under the UOC program.

Budget Item Justification

 R-1 Line Item 169

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE February 1999
BUDGET ACTIVITY 7 - Operational System Development										PROJECT C2270
PE NUMBER AND TITLE 0206313M Marine Corps Communications Systems										

UOC Schedule:

ID	Task Name	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
1	Phase0	HI 97	H2 97	HI 98	H2 98	HI 99	H2 99	HI 00	H2 00	HI 01	H2 01	HI 02
2	MS I			MS 6598								
3	Concept Demonstrator			12/1598								
4	MS II				MS 123199							
5	EDM/Delivery					12/1500						
6	DT&E						9/1001					
7	IOT&E							1/1502				
8	MS III								MS 93002			
9	ICO								9/1503			
10	FOC										9/2906	3/3007

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)									
BUDGET ACTIVITY					DATE		PROJECT		
7 - Operational System Development					February 1999		C2270		
PE NUMBER AND TITLE					0206313M Marine Corps Communications Systems				
					FY 1998	FY 1999	FY 2000	Budget to Complete	Total Program
A. (U) Project Cost Breakdown									
Primary HW/SW Development					4337	6908	19730		
Development Test and Evaluation					1197	1685	1879		
Program Management Support					493	1625	1500		
Total					6027	10218	23109		
B. Budget Acquisition History and Planning Information									
Performing Organizations									
Contractor or Government	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity	Project Office	Total Prior to FY 1998	FY 1998	FY 1999	FY 2000	Budget to Complete
Product Development Organizations									
EICOC:									
SSC Charleston	WR	Dec 99				0	0	8272	CONT
MCTSSA	RCP	Dec 99				0	0	520	CONT
SSC Charleston	WR	Dec 99				0	0	1080	CONT
TCO:									
MCTSSA, Camp Pendleton, CA	RCP	Jan99			0	584	1025	959	CONT
SPAWAR Charleston, SC	WR	Oct 97			0	72	102	103	CONT
IAS:									
NAWC, Pt. Mugu, CA	C/RCP	Oct 98		798	0	44	0	0	754
NSWC, Crane, IN	C/RCP	Oct 98			0	0	363	0	CONT
IAS MOD:									
NSWC, Crane, IN	C/RCP	Dec 98		1182	0	481	399	202	100
NAWC, Pt. Mugu, CA	C/RCP	Jan 00		717	0	0	0	150	567
					R-1 Line Item 169				
					Budget Item Justification				

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE	February 1999	PROJECT
BUDGET ACTIVITY										PE NUMBER AND TITLE		
7 - Operational System Development										0206313M Marine Corps Communications Systems		
IDASC:												
NSWC, Crane, IN	WR	Oct 97	445	445	0	205	240	0	0	0	445	
MCTSSA Camp Pendleton, CA	WR	Oct 97	471	471	0	229	242	0	0	0	471	
MAGTF C4I												
BASELINE:												
SPAWAR, San Diego, CA	C/PFF/RCP	Jan 98			0	352	212	1638	CONT	CONT		CONT
MCTSSA, Camp Pendleton, CA (to OSEC)	RCP	Jan 99			0	0	0	1638	CONT	CONT		CONT
SPAWAR, San Diego, CA (to INRI)	RCP	Jan 99			0	827	319	3143	CONT	CONT		CONT
MARCORSYSCO M, CTQ; Quantico, VA TBD	RCP	Jan 99	1846	1846	0	0	1846	0	0	0	1846	
AFATDS:												
USA, Ft. Sill, OK	CPFF/MIPR	Jan 97	1402	1402	0	1402	0	0	0	0	1402	
MCSC, Quantico, VA	CPFF/RCP	Oct 98			0	100	0	0	0	0	100	
USA, Ft Wayne, IN	CPFF/MIPR	Jan 99			0	0	0	0	0	CONT	CONT	
USA, Ft Monmouth, NJ	CPFF/MIPR	Jan 00	2786	2786	0	0	1385	1130	271	271	2786	
TCAP PIP:												
BTG, Fairfax, VA	RCP	Jan 00	2580	2580	0	0	775	895	910	910	2580	
ATACC:												
WR Robbins AFB, GA	RCP	Sep 98	41	41	0	41	0	0	0	0	41	
Support and Management Organizations												
EICOC:												
Marcorsyscom	WR	Dec 99			0	0	0	104	CONT	CONT		CONT
TCO:												
R-1 Line Item 169										Budget Item Justification		

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE	February 1999
BUDGET ACTIVITY		PE NUMBER AND TITLE									PROJECT
7 - Operational System Development		0206313M Marine Corps Communications Systems									C2270
ARL, Adelphi, MD		C/MIPR	Nov 98	125	125	0	50	75	0	0	125
MCTSSA, Camp Pendleton, CA		RCP	Oct 98	413	413	0	188	225	0	0	413
JITC, Ft. Huachuca, AZ		C/MIPR	Sep 99	40	40	0	0	40	0	0	40
IAS MOD:											
ARL, Adelphi, MD		C/MIPR	Jan 00			0	0	0	100	CONT	CONT
MCTSSA Camp Pendleton, CA		RCP	Jan 00			0	0	0	302	CONT	CONT
MAGTF C4I											
Baseline:											
MCTSSA, Camp Pendleton, CA		RCP	Jan 98	598	598	0	298	300	0	0	598
MCTSSA (to Contractor TBD)		RCP	Jan 00			0	0	0	1283	CONT	CONT
EICOC:											
MCTSSA, Camp Pendleton, CA		WR	Oct 97	3411	3411	0	581	980	0	1850	3411
SBIR TAX				157	157	0	0	157	0	0	157
Subtotal Product Development						Total				Budget to	Total
Subtotal Support and Management						Prior to				Complete	Program
Subtotal Test and Evaluation						FY 1998	FY 1998	FY 1999	FY 2000	CONT	CONT
Total Project							4337	6908	19730	CONT	CONT
							493	1468	1500	CONT	CONT
							1197	1842	1879	CONT	CONT
							6027	10218	23109	CONT	CONT
C. (U) Funding Profile: Not Applicable.										Budget Item Justification	
R-1 Line Item 169											

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE February 1999	
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT	
7 - Operational System Development		0206313M Marine Corps Communications Systems								C2271	
COST (In Millions)		FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
C2271	Maneuver C2 Systems	1486	2067	986	446	403	305	0	0	0	5693
Quantity of RDT&E Articles											
<p>A. (U) Mission Description and Budget Item Justification:</p> <p>(U) Maneuver C2 is the executive layer of decision support that retrieves and fuses information from the functional areas. It provides an integrated representation of the battlespace or a specific area of concern. The subprojects below develop systems which report unit status and location to the Tactical Combat Operations (TCO) and Advanced Tactical Air Command Central (ATACC). They also disseminate maneuver information throughout the battlespace.</p> <ol style="list-style-type: none"> 1. The Joint Tactical Information Distribution System (JTIDS) provides unit location and status in near-real-time, primarily for aircraft, ships, and air defense systems. 2. The Data Automated Communications Terminal (DACT) will extend situational awareness to echelons below the battalion level within the Marine Corps. The DACT will receive, store, retrieve, create, modify, transmit, and display map overlays, operational messages/reports, and position information via tactical radios, networks, and/or wire lines. A phased approach for fielding the full functionality of the system will be used consisting of software upgrades and enhancements to allow interoperability with other C4I systems <p>PROGRAM ACCOMPLISHMENTS AND PLANS</p> <p>(U) FY 1998 Accomplishments:</p> <ul style="list-style-type: none"> • (U) \$ 791 DACT: Developed positional, navigational, and message application software (Phase I software). • (U) \$ 170 DACT: Developed DACT vehicle mount assembly. • (U) \$ 145 DACT: Developed program documentation, program plans, and operational concepts. • (U) \$ 50 JTIDS: Continued support for the Joint JTIDS Link 16 IPT. • (U) \$ 100 JTIDS: Continued JTIDS participation in DII COE working group. • (U) \$ 210 JTIDS: Initiated and developed the interface TYQ-JTIDS to other Aviation C2 Agencies.. • (U) \$ 20 JTIDS: Program management support for various technical interchange meetings, demonstrations, and conferences. <p>(U)Total \$ 1,486</p>											
R-1 Line Item 169										Budget Item Justification	

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

February 1999

BUDGET ACTIVITY

PE NUMBER AND TITLE

0206313M Marine Corps Communications
Systems

PROJECT

C2271

7 - Operational System Development

(U) FY 1999 Planned Program:

- (U) \$ 185 DACT: Develop Phase II software.
- (U) \$ 468 DACT: Develop training package, program documentation, program plans, and operational concepts.
- (U) \$ 100 DACT: Perform DACT operational testing.
- (U) \$ 50 JTIDS: Continue engineering support for the Class 2/2H Terminals which will be used in JTIDS common processor.
- (U) \$ 476 JTIDS: Complete ECP to AN/TYQ JTIDS for TACC operations.
- (U) \$ 750 JTIDS: Commence integration of real time/non-real time data feeds to AN/TYQ JTIDS.
- (U) \$ 20 JTIDS: Program management support for various technical interchange meetings, demonstrations and conferences.
- (U) \$ 18 SBIR: Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638
- (U) Total \$ 2,067

(U) FY 2000 Planned Program:

- (U) \$ 460 DACT: Develop Phase III software.
- (U) \$ 150 DACT: Conduct follow-on developmental and operational testing.
- (U) \$ 376 DACT: Develop training package, documentation, and operational concepts for newly developed software functionality.
- (U) Total \$ 986

B. (U) Project Change Summary

- (U) Previous President's Budget
- (U) Adjustments to Previous President's Budget
- (U) Current Budget Submit

	FY 1998	FY 1999	FY 2000
	1413	2090	1834
	+73	-23	-848
	1486	2067	986

(U) Change Summary Explanation:

- (U) Funding: Increase in FY98 funding represents net reprogramming efforts.

FY99 Due to Revised Economic Assumption.

FY00 adjustments due to prioritization of program's within the Marine Corps, Non Pay Inflation.

- (U) Schedule: N/A

- (U) Technical: N/A

Budget Item Justification

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February 1999
BUDGET ACTIVITY		PE NUMBER AND TITLE									PROJECT
7 - Operational System Development		0206313M Marine Corps Communications Systems									C2271
C. (U) Other Program Funding Summary (APPN, BLI #, NOMEN)		FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost
(U) PMC, BLI #463200, DACT		0	12621	6838	9873	2343	0	0	0	0	31675
(U) O&M, DACT		98	257	411	423	302	199	0	0	TBD	TBD
(U) PMC, BLI #463200, JTIDS		7216	9734	0	0	0	0	0	0	0	16950
(U) Related RDT&E											
None											
R-1 Line Item 169										Budget Item Justification	

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PE NUMBER AND TITLE

**PROJECT
C2271**

0206313M Marine Corps Communications Systems

DACT Program Structure

Now At:

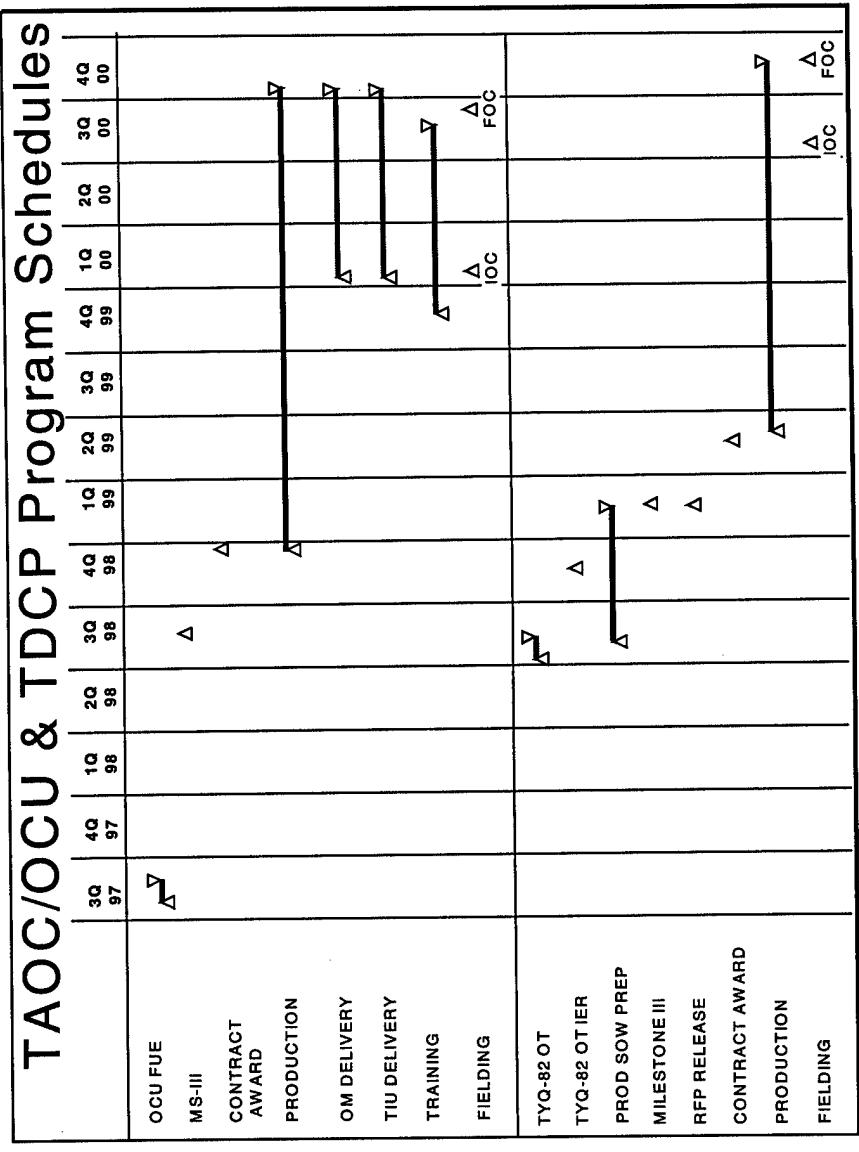
Acronyms:	
CMP	Configuration Management Plan
CRLCMP	Computer Resources Life Cycle Management Plan
DT	Developmental Test
FOC	Full Operational Capability
IKPT	Instructor & Key Personnel Training
ILSMT	Integrated Logistic Support Management Team
ILSP	Integrated Logistic Support Plan
IOC	Initial Operational Capability
IPP	Integrated Program and Procurement
LAR	Logistics Assessment Review
LARP	Low Rate Initial Production
MBL	Military Battle Lab
NET	New Equipment Training Team
OT	Operational Test
REP	Request for Proposal
SS	Source Selection
SWA	Software
ULSS	Ultimate Logistic Support Summary

Budget Item Justification

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1999
BUDGET ACTIVITY 7 - Operational System Development	PE NUMBER AND TITLE 0206313M Marine Corps Communications Systems	PROJECT C2271



JTIDS Schedule:

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February 1999
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT	
7 - Operational System Development		0206313M Marine Corps Communications Systems								C2272	
COST (In Millions)		FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
C2272	Intelligence C2 Systems	2702	4348	12839	7831	8493	8264	5288	5459	Continuing	Continuing
Quantity of RDT&E Articles											
<p>A. (U) Mission Description and Budget Item Justification: Intelligence Command and Control (C2) supports the employment of reconnaissance, surveillance, and target acquisition resources and the timely planning and processing of all-source intelligence. It ensures that all-source tactical intelligence is tailored to meet specific mission requirements. The systems below collect raw intelligence data on the battlefield, convert raw intelligence data into processed information and deliver the processed products to the Intelligence Analysis Systems (IAS) for analysis.</p> <ol style="list-style-type: none"> 1. The MANPACAK Secondary Imagery Distribution System (SIDS) is used to distribute processed imagery throughout the Marine Corps Communications Systems. 2. Tactical Exploitation of National Capabilities (TENCAP) is a program designed to enhance the ability of tactical Marine Corps forces to exploit the capabilities of national intelligence-gathering systems. Congressionally directed, it requires close liaison with the intelligence community and involves complex and highly-sensitive activities. 3. The Topographic Production Capability (TPC) is an advanced Geographic Information System, which employs commercial computer and software to provide the framework data for the common battlefield visualization by producing both hardcopy and digital geographic intelligence. 4. The Joint Surveillance Target Attack Radar (JSTARS) connectivity program will develop software which will allow the JSTARS Moving Target Indicator (MTI), Fixed Target Indication (FTI) and Synthetic Aperture Radar (SAR) Data to be passed from the JSTARS Common Ground Station (CGS) to lower echelons within the MAGTF. The IAS and TCO will host the JSTARS Connectivity Software. Once the Connectivity Software has developed a requirement for a JSTARS CGS software, upgrade is anticipated under Joint Program Office Pre-Planned Product Improvement (P3I) initiative. 5. The Coastal Battlefield Reconnaissance and Analysis (COBRA) system is a passive multispectral sensor system capable of operating in a PIONEER unmanned aerial vehicle (UAV). Imagery recorded on the UAV or disseminated via data link is analyzed by the COBRA ground station. Ground station algorithm processing provides near real-time automatic minefield detection with Differential Global Positioning System (DGPS) location accuracy. <p>PROGRAM ACCOMPLISHMENTS AND PLANS:</p> <p>(U) FY 1998 Accomplishments:</p> <ul style="list-style-type: none"> • (U) \$ 49 MANPACK SIDS: Completed modification of the COTS Digital Camera. 											
R-1 Line Item 169										Budget Item Justification	

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 1999
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
7 - Operational System Development	0206313M Marine Corps Communications Systems	C2272	
• (U) \$	1016	TENCAP: Demonstrated the technical feasibility and tactical utility of Enhanced National-Tactical Imagery, Communications External Dissemintation (ENTICED) into Marine Corps C4I architecture via the RADIANT MERCURY multi-level security system. ENTICED provided enhanced IMINT, ELINT, and COMINT dissemintation within existing Marine Corps C4I architecture.	
• (U) \$	1017	TENCAP: Initiated a concept development effort to provide nationally and tactically collected Signal Intelligence (SIGINT) data to small tactical units and teams, on a portable, lightweight device. Project RAIDER, wil focus on delivering this data to those teams conducting highly mobile, low intensity, short duration operations such as Non-combatant Evacuation Operations (NEO), and Tactical Recovery of Aircraft and Personnel (TRAP).	
• (U) \$	205	TENCAP: Evaluated Tailored, Topographic Imagery Manipulation, Extraction and Dissemination (T-TIMED) project which will provide the tactical operator with the desired and required nationally derived topographic information on an as-needed basis, merged and correlated with imagery from standard workstations (i.e. IAS) and displays on laptops and DACT like devices.	
• (U) \$	215	TENCAP: Continued to support TENCAP training and education efforts by providing various TENCAP simulation, scripting, and processing hardware, software and exercise support to training centers and Fleet units deployed and in garrison.	
• (U) \$	200	TENCAP: Continued participation in National Intelligence Systems Data (NISD), evaluating the utility of emerging exploitation, automated and manual target recognition and detection tools, and emerging reconnaissance technologies. Formulate and submit Tactical Impact Statements (TIS) as required by Congress.	
• (U) \$	0	JSTARS: Initiated the development of USMC hardware and software connectivity between the JSTARS system and the required JSTARS Connectivity sites and MAGTF C4I systems. This effort forward financed with \$229 FY97 funds from this project and PE.	
(U)Total \$	2,702		
(U) FY 1999 Planned Program:			
• (U) \$	200	MANPACK SIDS: Complete software upgrade to maintain NITFS standards and improve compression algorithms.	
• (U) \$	1859	TENCAP: Conduct advance technology demonstrations and integration into the established MAGTF C4I architecture.	
• (U) \$	356	TENCAP: Conduct technical assessments of emerging national data dissemination capabilities.	
• (U) \$	461	TENCAP: Continue to support operational planning to enhance operating force capabilities to US national intelligence data witin the MAGTF C4I architecture.	
• (U) \$	437	TENCAP: Evaluate the utility of emerging exploitation, automated and manual target recognition and detection tools.	
• (U) \$	100	TENCAP: Continue TENCAP training and education efforts by providing the Fleet Marine Force with various TENCAP simulation, scripting, and processing hardware and software support.	
• (U) \$	250	JSTARS: Perform tests and exercise with the JSTARS CGS and JSTARS connectivity prototype(s).	
• (U) \$	626	JSTARS: Continue to develop connectivity software.	
• (U) \$	59	SBIR: Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.	
(U)Total \$	4,348		
R-1 Line Item 169		Budget Item Justification	

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 1999
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
7 - Operational System Development	0206313M Marine Corps Communications Systems	C2272	
<div>(U) FY 2000 Planned Program:</div> <div><div><div>(U) \$</div><div>332</div><div>TPC: Initiate test and evaluations.</div></div><div><div>(U) \$</div><div>765</div><div>TPC: Initiate engineering, manufacturing and development.</div></div><div><div>(U) \$</div><div>2300</div><div>TPC: Operational systems development.</div></div><div><div>(U) \$</div><div>100</div><div>TPC: In-house program management.</div></div><div><div>(U) \$</div><div>138</div><div>TPC: Contractor advisory and assistance services.</div></div><div><div>(U) \$</div><div>1966</div><div>TENCAP: Continue advance technology demonstrations and integration into the established MAGTF C4I architecture.</div></div><div><div>(U) \$</div><div>384</div><div>TENCAP: Continue technical assessments of emerging national data dissemination capabilities.</div></div><div><div>(U) \$</div><div>470</div><div>TENCAP: Continue to support operational planning to enhance operating force capabilities to US national intelligence data within the MAGTF C4I architecture.</div></div><div><div>(U) \$</div><div>445</div><div>TENCAP: Continue to evaluate the utility of emerging exploitation, automated and manual target recognition and detection tools.</div></div><div><div>(U) \$</div><div>125</div><div>TENCAP: Continue TENCAP training and education efforts by providing the Fleet Marine Force with various TENCAP simulation, scripting, and processing hardware and software support.</div></div><div><div>(U) \$</div><div>1900</div><div>JSTARS: Continue to develop connectivity software.</div></div><div><div>(U) \$</div><div>366</div><div>JSTARS: Engineering and technical management support for connectivity software.</div></div><div><div>(U) \$</div><div>148</div><div>COBRA: MarCorSysCom program contractor support activities.</div></div><div><div>(U) \$</div><div>200</div><div>COBRA: Coastal Systems Station program engineering support.</div></div><div><div>(U) \$</div><div>2950</div><div>COBRA: Engineering, manufacturing and development.</div></div><div><div>(U) \$</div><div>100</div><div>COBRA: Preliminary design review.</div></div><div><div>(U) \$</div><div>150</div><div>COBRA: Pre-Critical Design Review Documentation.</div></div><div><div>(U)Total \$</div><div>12,839</div><div></div></div></div>			
R-1 Line Item 169		Budget Item Justification	

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February 1999
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT	
7 - Operational System Development		0206313M Marine Corps Communications Systems								C2272	
B. (U) Project Change Summary		FY 1998	FY 1999	FY 2000							
(U) Previous President's Budget		2975	3507	3951							
(U) Adjustments to Previous President's Budget		-273	+841	+8888							
(U) Current Budget Submit		2702	4348	12839							
(U) Change Summary Explanation:											
(U) Funding:		FY 98 adjustments are due to internal reprogramming.									
		FY99 adjustment due to JSTARS moving from C2277, PE26313M, revised economic assumption and adjustments to CAAS.									
		FY 00 adjustment is due to prioritization of programs within the Marine Corps.									
(U) Schedule:		N/A									
(U) Technical:		N/A									
C. (U) Other Program Funding Summary		FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To	Total
(APPN, BLI #, NOMEN)										Compl	Cost
PMC BLI 474700 Intelligence Support Equipment		3903	0	0	0	0	0	0	0	0	3791
MANPACK SIDS											
PMC BLI 474700 Intelligence Support Equipment		0	0	0	7264	6737	3999	1610	583	Cont	Cont
TPC											
PMC BLI #474900 JSTARS		0	1017	982	0	973	0	973	0	Cont	Cont
(U) Related RDT&E											
(U) PE 0301301L (Department of Defense Intelligence and Information Systems/Military Intelligence Integrated Data System/Integrated Data Base I and II)											
(Defense Intelligence Agency)											
(U) PE 0604270A (Intelligence and Electronic Warfare Common Sensor (IEWCS), TACJAM-A)											
(U) PE 0305885G (Tactical Cryptologic Program)											
(U) PE 0603730A (Tactical Surveillance System - Advanced Development), Army TENCAP, Project D560(U)PE 0603766A (Tactical Electronic Surveillance System - Advance Development), Army TENCAP, Project D907											
(U) PE 0604740A (Tactical Surveillance System - Engineering Development), OSD TENCAP, Project D662											
(U) PE 0902398M (United States Special Operations Command), Chariot Program											
(U) PE 0605867N (SEW Surveillance/Reconnaissance Support), Project Z1034											
R-1 Line Item 169											Budget Item Justification

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 1999
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
7 - Operational System Development	0206313M Marine Corps Communications Systems	C2272	

(U) Schedule Profile:

SIDS Schedule

MANPACK SIDS MILESTONE SCHEDULE						
PHASE	FY 98	FY 99	FY 00	FY 01	FY 02	
MILESTONE 0						
MILESTONE I/II						
OT						
MILESTONE III						
PRODUCTION CONTRACT AWARD						
PRODUCTION						
IOC						
FOC						

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Budget Item Justification

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1999
BUDGET ACTIVITY 7 - Operational System Development	PE NUMBER AND TITLE 0206313M Marine Corps Communications Systems	PROJECT C2272

TPC Schedule

Topographic Production Capability MILESTONE SCHEDULE

PHASE	FY 98	FY 99	FY 00	FY 01	FY 02	FY 03	FY 04	FY 05
MILESTONE 0			▲ 2nd Qtr					
MILESTONE I		▲ 3rd Qtr						
MILESTONE II			▲ 4th Qtr					
OT			● 3rd Qtr					
MILESTONE III				▲ 1st Qtr				
PRODUCTION CONTRACT AWARD				● 1st Qtr				
IOC				▲ 2nd Qtr				
FOC					▲ 3rd Qtr			
P3I,Phase 1						▲ 4th Qtr		
P3I,Phase 2							▲ 4th Qtr	

R-1 Line Item 169

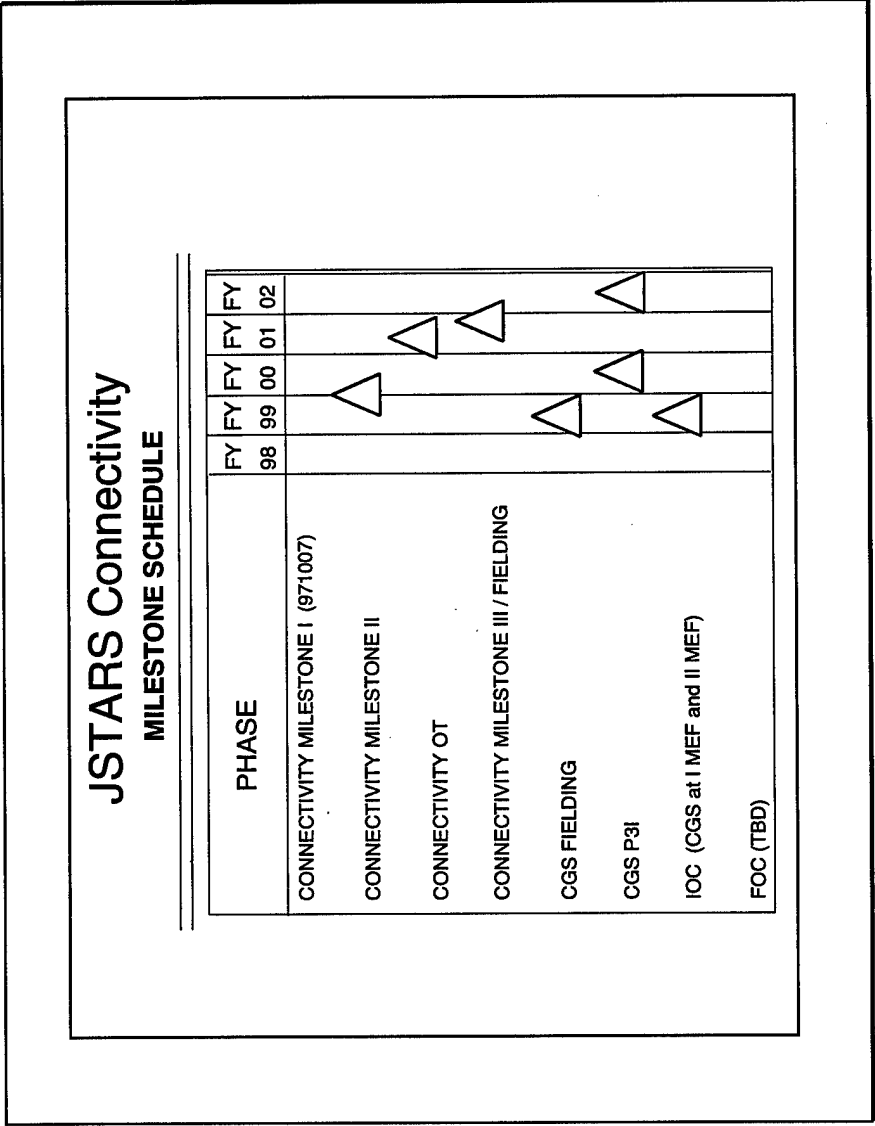
Budget Item Justification

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 1999
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
7 - Operational System Development	0206313M Marine Corps Communications Systems	C2272	

JSTARS Schedule:



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Budget Item Justification

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)					DATE	February 1999
BUDGET ACTIVITY		PE NUMBER AND TITLE				PROJECT
7 - Operational System Development		0206313M Marine Corps Communications Systems				C2272
		FY 1998	FY 1999	FY 2000		
A. (U) Project Cost Breakdown						
a. Program Management Support		0	0	295		
b. Engineering Support		0	126	412		
c. TENCAP Concept Development/Feasibility Demonstration		1474	1859	2589		
d. TENCAP Training/Exercise Support to FMF		100	100	126		
e. System Design/Integration/Development		102	356	6747		
f. Management Support Services		518	461	645		
g. Software Development		508	1446	2025		
h. Primary Hardware Development				0		
Total		2702	4348	12839		
B. Budget Acquisition History and Planning Information						
Performing Organizations						
Contractor or Government	Contract Method/Type	Award or Obligation	Performing Activity	Project Office	Total Prior to FY 1998	Budget to Complete FY 2000
Performing Activity	Vehicle	Date	EAC	EAC	FY 1998	FY 1999
Product Development Organizations						
TENCAP:						
Booz-Allen & Hamilton	RCP	Jan 97		2392	2035	2819
JSTARS:						
TBD	MIPR	Mar 00	2266	0	0	0
JSTARS:						
TBD	MIPR	Mar 01	394	0	0	0
JSTARS:						
TBD	MIPR	Mar 99	876	0	0	876
COBRA:						
TBD	RCP	Feb 00		0	0	0
TPC:						
					Budget Item Justification	
					R-1 Line Item 169	

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)					DATE	February 1999																																				
BUDGET ACTIVITY		PE NUMBER AND TITLE			PROJECT																																					
7 - Operational System Development		0206313M Marine Corps Communications Systems			C2272																																					
MRI Inc.	RCP	Mar 00	3065	3065	0	3065																																				
Support and Management Organizations																																										
TENCAP:																																										
Booz, Allen & Hamilton	Various	Jan 97		618	453	576																																				
COBRA:																																										
CSS	WR	Mar 00		0	0	450																																				
BRTJRC	RCP	Mar 00		0	0	148																																				
TPC:																																										
TBD	RCP	Mar 00		0	0	238																																				
Test and Evaluation Organizations																																										
SIDS:																																										
NAWC, PT Mugu	WR	Dec 96	249	49	200	0																																				
TPC:																																										
TBD	WR	Mar 00				332																																				
Subtotal Product Development																																										
Subtotal Support and Management																																										
Subtotal Test and Evaluation																																										
Total Project																																										
C. (U) Funding Profile: Not Applicable.																																										
<table><tr><td>Total</td><td>FY 1998</td><td>FY 1999</td><td>FY 2000</td><td>Budget to Complete</td><td>Total Program</td></tr><tr><td>Prior to</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>FY 1998</td><td>2392</td><td>3695</td><td>11095</td><td>CONT</td><td>CONT</td></tr><tr><td></td><td>435</td><td>453</td><td>1412</td><td>CONT</td><td>CONT</td></tr><tr><td></td><td></td><td>200</td><td>332</td><td>CONT</td><td>CONT</td></tr><tr><td></td><td>2827</td><td>4348</td><td>12839</td><td>CONT</td><td>CONT</td></tr></table>							Total	FY 1998	FY 1999	FY 2000	Budget to Complete	Total Program	Prior to						FY 1998	2392	3695	11095	CONT	CONT		435	453	1412	CONT	CONT			200	332	CONT	CONT		2827	4348	12839	CONT	CONT
Total	FY 1998	FY 1999	FY 2000	Budget to Complete	Total Program																																					
Prior to																																										
FY 1998	2392	3695	11095	CONT	CONT																																					
	435	453	1412	CONT	CONT																																					
		200	332	CONT	CONT																																					
	2827	4348	12839	CONT	CONT																																					
R-1 Line Item 169					Budget Item Justification																																					

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE		February 1999	
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT			
7 - Operational System Development		0206313M Marine Corps Communications Systems								C2273			
COST (In Millions)		FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost		
C2273 Air Operations C2 Systems		4355	6289	16415	25747	23083	8612	6768	4094	Continuing	Continuing		
Quantity of RDT&E Articles													
<p>A. (U) Mission Description and Budget Item Justification: Air Operations C2 coordinates and plans Navy and Marine air combat operations and interfaces with joint and combined forces air operations. It also interfaces with fire support C2. The systems in this project are used to detect aircraft and missiles, process the detected information, deliver the processed information to the Advanced Tactical Air Command Central (ATACC), and conduct the air battle.</p> <ol style="list-style-type: none"> 1. The Tactical Air Operations Module (TAOM) improves the current system; the TAOM is the center for directing aircraft and anti-air systems in real time as part of the joint air battle. 2. The Air Defense Communications Platform (ADCP) provides an interface between the AN/TPS-59 (V)3 radar and for tactical ballistic missile defense as a JTIDS network user, the ADCP provides a direct interface between the AN/TPS-59 (v)3 and the joint services. 3. Aviation radars (AV RDR) are used to detect the location and identity of aircraft and missiles in the battle area. 4. Theater Battle Management Core Systems (TBMCS) provides the commander the automated tools necessary to generate, disseminate and execute the Air Tasking Order (ATO), as mandated by the Chairman, Joint Chiefs of Staff in July 1993. It is an evolutionary acquisition, allowing for the rapid development/fielding of hardware and software to meet today's rapidly advancing technology. It is fielded to all four Marine Tactical Air Command Squadrons (MTACS) and the supporting establishment with Marine Aviation Weapons and Tactics School (MAWTS) and the Battletest Training Facility (BSTF) sharing a system. Beginning FY00, CTAPS is migrating to the Theater Battle Management Core Systems (TBMCS) program within the USAF, and will change names from CTAPS to TBMCS. 5. The Common Aviation Command and Control System (CAC2S) will provide a common baseline of equipment, computer hardware, and software required to perform the mission of the Marine Air Command and Control System (MACCS). CAC2S will provide a complete and coordinated modernization effort for the equipment of the Marine Air Command and Control System (MACCS) to support its employment in an Operational Maneuver From The Sea (OMFTS) environment. The CAC2S will eliminate the current dissimilar aviation Command & Control systems, and will add the capability for aviation combat direction and air defense functions. CAC2S will be comprised of standardized tactical facilities, hardware, software and will significantly reduce the physical size and logistical footprint of existing MACCS equipment suite. Utilizing common hardware, the CAC2S will be an open architecture system that will migrate to the DII COE. Furthermore, CAC2S will execute real time functions of controlling aircraft and missiles, and employing weapons systems against time critical targets. CAC2S will provide a capability that allows operators to integrate Marine aviation into joint and combined air/ground operations. CAC2S will provide the tools that perform aviation C2 planning and execution functions in a positive control environment. CAC2S will assimilate the missions and fiscal resources of the Tactical Air Operations Center (TAOM), Tactical Air Command Center and the Direct Air Support Center (DASC) and the Air Defense Communications Platform (ADCP). 													
R-1 Line Item 169										Budget Item Justification			

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 1999
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
7 - Operational System Development	0206313M Marine Corps Communications Systems	C2273	
PROGRAM ACCOMPLISHMENTS AND PLANS:			
(U) FY 1998 Accomplishments:			
• (U) \$	193 ADCP: Executed a comprehensive plan to prepare and test the ADCP for JTIDS joint certification.		
• (U) \$	180 TAOM: Completed development of DII COE TADIL J Common Segment in preparation for MS III award during 1 st qtr FY98.		
• (U) \$	292 TAOM: Continued closed system (AYK-14) to open system migration.		
• (U) \$	384 TAOM: Conduct Theater Ballistic Missile Defense (TBMD) implementation into the TAOM.		
• (U) \$	350 TAOM: Program support, which consists of contractor support to provide documentation, hardware/software engineering, and logistics analysis to the program office; support of developmental testing, IPR, and contract management.		
• (U) \$	2529 AV RDR: Analyzed and developed ECP's to increase AN/TPS-59 radar detection and targeting capability within the Antenna Array Transmitters and Receivers.		
• (U) \$	427 AV RDR: Program in Process Review (IPR), and contract management.		
• (U) \$	0 AV RDR: Analyzed and developed ECP-s to increase AN/TPS-59 radar detection and targeting capability within the Antenna Array Transmitters and Receivers. This effort forward finance with \$229K FY97 funds from this PE and Project.		
(U)Total \$	4,355		
(U) FY 1999 Planned Program:			
• (U) \$	209 ADCP: Continue software enhancements concentrating on testing for JTIDS joint certification and a complete VMF development/meshnet upgrades.		
• (U) \$	766 TAOM: Continue closed system (AYK-14) to open system migration.		
• (U) \$	460 TAOM: Continue TMD implementation into the TAOC.		
• (U) \$	128 TAOM: Program support, which consists of contractor support to provide documentation, hardware/software engineering, and logistics analysis to the program office; support of operational testing, IPR, and contract management.		
• (U) \$	63 AV RDR: Continue MCTSSA software support.		
• (U) \$	410 AV RDR: Program contractor support		
• (U) \$	247 AV RDR: ECP development in support of MCCES radar trainers.		
• (U) \$	97 CTAPS: Initiate USMC'S management of Theater Battle Management Core System (TBMCS) 1.0 development		
• (U) \$	500 CAC2S: Program Management Support.		
• (U) \$	2431 CAC2S: Initiate the migration of existing equipment to a technology, demonstration laboratory (TDL).		
• (U) \$	911 CAC2S: Conduct exercises with TDL equipment to determine optimum equipment mix and organization.		
• (U) \$	67 SBIR : Portion of of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC638.		
(U)Total \$	6,289		
		R-1 Line Item 169	Budget Item Justification

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 1999																
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT																	
7 - Operational System Development	0206313M Marine Corps Communications Systems	C2273																	
<p>(U) FY 2000 Planned Program:</p> <ul style="list-style-type: none"> • (U) \$ 200 ADCP: Complete VMF development/meshnet upgrades. • (U) \$ 81 ADCP: Continue software modifications. • (U) \$ 7462 AV RDR: Initiate Safety ECP's developing a replacement IFF Interrogator, maintenance lift, False Alarm Adaptation (FAA) software, and begin development of special TBM modes software for increased range and enhanced operation. • (U) \$ 300 AV RDR: Program in Process Review (IPR), and contact management. • (U) \$ 593 AV RDR: Perform studies and analysis to determine the best approach for upgrading the 59 radar Electronic Protection capability during a POM-02 initiative in compliance with phase II of the ORD. • (U) \$ 319 TBMCs: Continue USMC's TBMCs development. • (U) \$ 25 TBMCs: Continue MCTSSA TBMCs software support. • (U) \$ 284 TBMCs: Program support to provide documentation, and support of TBMCs development and testing. • (U) \$ 2659 CAC2S: Initiate Phase II system engineering, software design and development efforts. • (U) \$ 2120 CAC2S: Initiate Processing and Display Suite (PDS) efforts. • (U) \$ 985 CAC2S: Conduct initial sensor interface/integration and interoperability testing. • (U) \$ 690 CAC2S: Initiate communication package effort. • (U) \$ 690 CAC2S: Initiate integration of Engineering Development Model (EDM) hardware with existing assets and development of shelter configurations. • (U) \$ 600 CAC2S: Program Management Support (U)Total \$ 16,415 																			
<p>B. (U) <u>Project Change Summary</u></p> <table> <tr> <td>(U) Previous President's Budget</td> <td>FY 1998</td> <td>FY 1999</td> <td>FY 2000</td> </tr> <tr> <td>(U) Adjustments to Previous President's Budget</td> <td>5135</td> <td>6366</td> <td>6277</td> </tr> <tr> <td>(U) Current Budget Submit</td> <td>-780</td> <td>-77</td> <td>+10138</td> </tr> <tr> <td></td> <td>4355</td> <td>6,289</td> <td>16415</td> </tr> </table>				(U) Previous President's Budget	FY 1998	FY 1999	FY 2000	(U) Adjustments to Previous President's Budget	5135	6366	6277	(U) Current Budget Submit	-780	-77	+10138		4355	6,289	16415
(U) Previous President's Budget	FY 1998	FY 1999	FY 2000																
(U) Adjustments to Previous President's Budget	5135	6366	6277																
(U) Current Budget Submit	-780	-77	+10138																
	4355	6,289	16415																
		R-1 Line Item 169	Budget Item Justification																

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February 1999	
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT		
7 - Operational System Development		0206313M Marine Corps Communications Systems								C2273		
(U) Change Summary Explanation:												
(U) Funding: FY 1998 changes due to minor affordability adjustments.												
FY 1999 Due to Revised Economic Assumption.												
FY 00 adjustment is due to prioritization of programs within the Marine Corps and due to Congressional adjustments to AN/TPS-59 in the amount of \$5.5M for aviation radars (AV RDR) which provide a direct interface between the AN/TPS-59(V)3 and the Joint Services and to detect the location and identity of aircraft and missiles in the battle area.												
(U) Schedule: Not Applicable												
(U) Technical: Not applicable												
C.	(U)	Other Program Funding Summary	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost
		(APPN, BLI #, NOMEN)										
	(U)	PMC, BLI#464000, TAOM	10,671	6,706	0	0	0	0	0	0	0	17,377
	(U)	PMC, BLI#464000, TBMCs	400	1,462	4152	3197	3421	2510	6743	3583	CONT	CONT
	(U)	PMC, BLI#463700, ADCP	0	2,096	0	0	0	0	0	0	0	2,096
	(U)	PMC, BLI#463600, TPS-59 ECPS	5,476	8,322	1,314	1,368	3,847	20,815	17,954	10,739	0	69,835
	(U)	PMC, BLI#463600, AN/TPS-59	0	0	1,066	0	0	0	0	0	0	1,066
	(U)	PMC BLI #464000 Air Ops Systems CAC2S	0	0	0	0	0	19,753	43,895	45,980	CONT	CONT
	(U)	O&M, TAOM	0	0	0	0	0	0	0	0	0	0
	(U)	O&M, ADCP	375	361	0	0	0	0	0	0	0	736
	(U)	O&M, AN/TPS-59	0	0	0	0	0	0	0	0	0	0
	(U)	O&M, CTAPS	0	200	266	347	0	0	0	0	0	813
(U) Related RDT&E												
PE 0603216C (Ballistic Missile Defense Organization, Theater Missile Defense)												
R-1 Line Item 169										Budget Item Justification		

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 1999
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
7 - Operational System Development	0206313M Marine Corps Communications Systems	C2273	

D. (U) TAOM Milestone Schedule Profile

TAOM Schedule:

TAOC/OCU & TDCP Program Schedules														
	3Q 97	4Q 97	1Q 98	2Q 98	3Q 98	4Q 98	1Q 99	2Q 99	3Q 99	4Q 99	1Q 00	2Q 00	3Q 00	4Q 00
OCU FUE	Δ													
MS-III				Δ										
CONTRACT AWARD						Δ								
PRODUCTION							Δ							
OM DELIVERY								Δ						
TIU DELIVERY									Δ					
TRAINING										Δ				
FIELDING											Δ	IOC		Δ FOC
TYQ-82 OT														
TYQ-82 OT IER														
PROD SOW PREP														
MILESTONE III														
RFP RELEASE														
CONTRACT AWARD														
PRODUCTION														
FIELDING														

R-1 Line Item 169

Budget Item Justification

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C2273

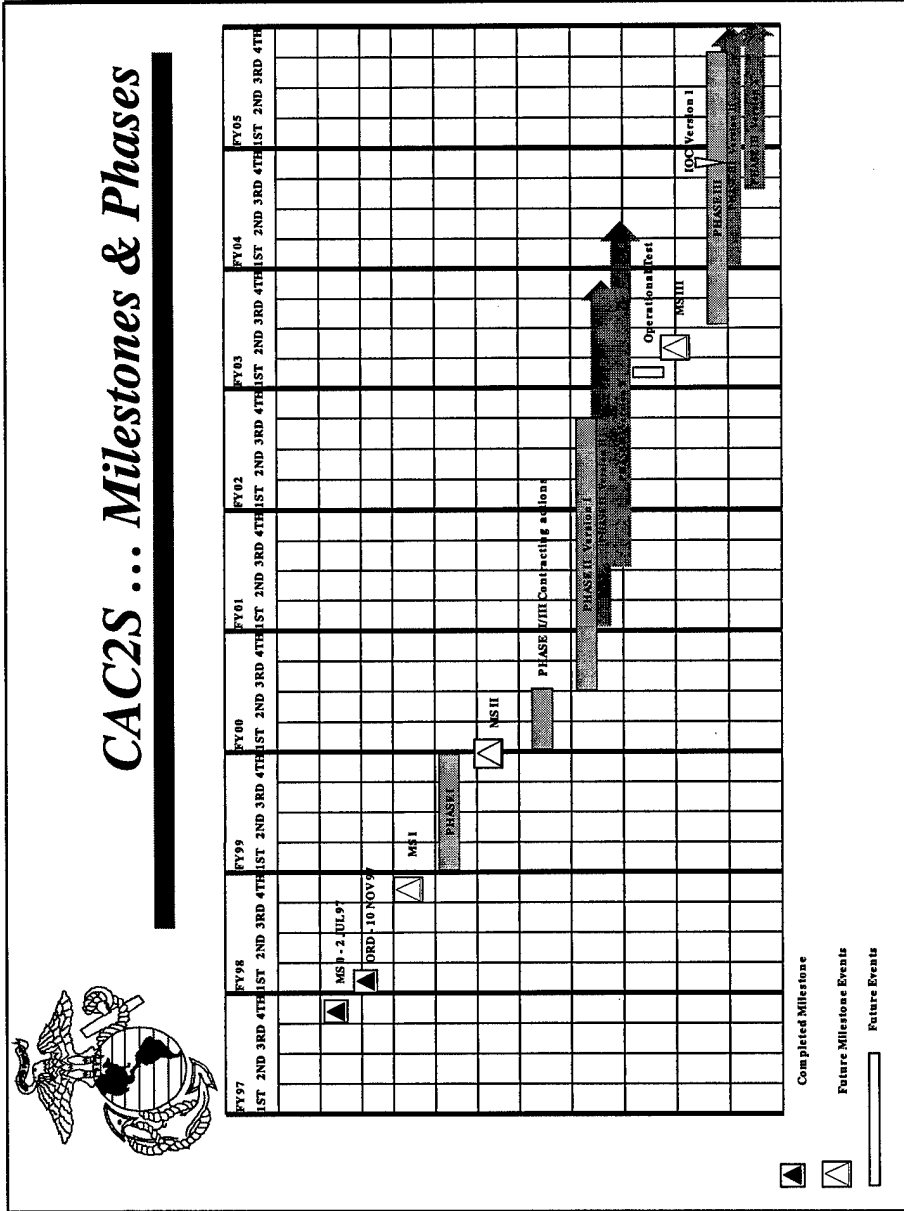
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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 1999
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
7 - Operational System Development	0206313M Marine Corps Communications Systems	C2273	
TPS-59 RADAR SCHEDULE:			
(V)3 Fielding Schedule:	3 rd Qtr 98 thru 3 rd Qtr 99		
IOC:	Sep 98		
FOC:	Aug 99		
CEC Integration:	1 st Qtr 99 thru 4 th Qtr 00		
Develop:	1 st Qtr 99 thru 3 rd Qtr 00		
IV&V:	3 rd Qtr 99 thru 4 th Qtr 00		
Antenna Upgrades:	1 st Qtr 99 thru 3 rd Qtr 04		
Procure (Various):	1 st Qtr 99 thru 4 th Qtr 03		
IOC:	2 nd Qtr 01		
FOC:	3 rd Qtr 04		
		R-1 Line Item 169	Budget Item Justification

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 1999
BUDGET ACTIVITY		PROJECT	C2273
7 - Operational System Development		PE NUMBER AND TITLE	0206313M Marine Corps Communications Systems

CAC2S Schedule:



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Budget Item Justification

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)					DATE	PROJECT
BUDGET ACTIVITY						
7 - Operational System Development						
PE NUMBER AND TITLE						
0206313M Marine Corps Communications Systems						C2273
Support and Management Organizations						
TBMCS:						
3 rd MAW	WR	Oct 98	0	0	10	0
MARCORSYSCOM	WR	Oct 98	0	0	67	0
ESC	MIPR	Dec 99	0	0	0	319
Hanscom AFB, MA						
CAC2S:						
MARCORSYSCOM	WR	Oct 98	0	0	100	100
Logicon	IDIQ	Oct 98	0	0	500	832
MITRE, Bedford, MA	MIPR	Oct 98	0	0	200	200
MCTSSA, Camp Pendleton, CA	WR	Oct 98	0	0	0	200
ADCP:						
NSWC Crane IN	WR	Oct 96	0	193	100	150
MCTSSA, Camp Pendleton, CA	WR	Oct 98	0	0	85	100
MARCORSYSCOM	WR	Oct 98	0	0	24	31
TAOM:						
Logicon Stafford VA	FFP	Oct 99	0	178	236	0
MCSC	WR	Oct 97	0	12	25	0
Quantico, VA						
AV RADAR:						
MCSC, Quantico, VA	WR	Oct 99	0	0	25	38
MCSC, Quantico, VA	RCP	Oct 99	0	0	52	208
Quantico, VA	CPFF	Oct 99	0	0	0	547
Logicon, Stafford, VA						

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Budget Item Justification

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UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)					DATE	February 1999	PROJECT
BUDGET ACTIVITY		PE NUMBER AND TITLE					
7 - Operational System Development		0206313M Marine Corps Communications Systems			C2273		
TBMCS:							
MCTSSA,	WR	Oct 99	0	0	106	CONT	CONT
Camp Pendelton, CA	WR	Oct 99	0	0	20	47	CONT
3D Maw.							
El Toro, CA							
Logicon, Stafford,	CPFF	Oct 99	0	0	156	CONT	CONT
VA							
SBIR TAX			0	0	67	0	67
Test and Evaluation Organizations							
Total			FY 1998		FY 1999		Total
Prior to			FY 1998		FY 1999		Program
FY 1998			3972		4855		CONT
			383		1434		CONT
Subtotal Product Development			4355		6289		CONT
Subtotal Support and Management							
Subtotal Test and Evaluation							
Total Project							
C. (U) Funding Profile: Not Applicable.							

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February 1999	
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT		
7 - Operational System Development		0206313M Marine Corps Communications Systems								C2274		
COST (In Millions)		FY 1998 Actual	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
C2274 C2 Warfare Systems		3384	3939	8387	3504	4374	5046	3213	3403	Continuing	Continuing	Continuing
Quantity of RDT&E Articles												
<p>A. (U) Mission Description and Budget Item Justification: Command and Control (C2) Warfare Project includes the following tactical electronic intercept, direction finding, and electronic attack systems:</p> <ol style="list-style-type: none"> 1. The Tactical Electronic Reconnaissance Processing and Evaluation System (TERPES) is used to process, sort, analyze, display and correlate ES and EA data collected by EA-6B aircraft and maintain the Tactical Electronic Orders of Battle. 2. The Mobile Electronic Warfare Support System (MEWSS) will be used to collect and process electronic intelligence and provide electronic attack capability from a mobile ground platform. 3. Team Portable collection System (TPCS) upgrade is a semi-automated, manpackable/team transportable signals intelligence system that provides communications intercept, radio direction finding analysis and reporting to the Marine Air Ground Task Force (MAGTF) Commander. 4. The Radio Reconnaissance Equipment Program (RREP) provides the FMF Radio Battalions, Radio Reconnaissance Platoons (RRP) with mission unique Signals Intelligence/Ground Electronic Warfare SIGINT/EW Equipment suites. Continuing with an evolutionary acquisition approach, the second suite RREP-SS-2 will provide the RRP's with the capability to conduct SIGINT/EW operations in support of Marine Air Ground Task Force (MAGTF) Commanders during advance force special operations, and other special purpose missions where the use of conventional Radio Battalion assets are not feasible. RREP-SS-2 is a ruggedized, modular, man packable system specifically designed utilizing emerging NDI/COTS/GOTS technology for RRP operations, particularly those conducted under the most austere conditions. The RREP-SS-2 module configuration has an "open systems" architecture that will permit future upgrades by simply installing cutting edge NDI/COTS/GOTS technology into the standard modules. The third suite, RREP-SS-3, to be fielded in FY04, will have the added capability to intercept those emerging target sets as identified by the NSA, be operated from remoted positions, and incorporate polymer battery technologies. 												
R-1 Line Item 169										Budget Item Justification		

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 1999
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
7 - Operational System Development	0206313M Marine Corps Communications Systems	C2274	

PROGRAM ACCOMPLISHMENTS AND PLANS:	
<p>(U) FY 1998 Accomplishments:</p> <ul style="list-style-type: none"> • (U) \$ 572 MEWSS: Successfully conducted IOT&E. • (U) \$ 258 MEWSS: Continued USMC unique subsystem development for direction finding and communications emitters. • (U) \$ 214 MEWSS: Upgrade task and reporting capability. • (U) \$ 290 TPCS Upgrade: Initiated TPCS Upgrade software development to control and exploit special signal receivers and analysis tools. • (U) \$ 164 TPCS Upgrade: Systems Engineering and Technical Assistance (SETA). • (U) \$ 1000 TERPES: Continuing upgrades to TERPES mission planning software to maintain compatibility with the EA-6B aircraft software changes. • (U) \$ 460 TERPES: Continuing development of Tactical Automation Sanitation capability or similar Multi-Level Security (MLS) device or procedure. • (U) \$ 426 TERPES: Beginning software development of Link 16 TADIL J to be incorporated into fusion processor. (U)Total \$ 3,384 	<p>(U) FY 1999 Planned Program:</p> <ul style="list-style-type: none"> • (U) \$ 335 MEWSS: Development of performance enhancing ECP for Electronic Attack integration. • (U) \$ 100 MEWSS: Development of performance enhancing ECP for SATCOM radio integration. • (U) \$ 295 TPCS Upgrade: Transition TPCS Upgrade 2.0 Software to Defense Information Infrastructure (DII) Common Operating Environment (COE). • (U) \$ 217 TPCS Upgrade: Fund Phase II IOT&E of TPCS Upgrade. • (U) \$ 285 TPCS Upgrade: Software revisions to TPCS Upgrade 2.0 software. • (U) \$ 290 TPCS Upgrade: Hardware revisions to TPCS Upgrade. Achieve MSIII. • (U) \$ 178 TPCS Upgrade: Systems Engineering and Technical Assistance (SETA). • (U) \$ 900 TERPES: Continue development of TERPES mission planning software to maintain compatibility with the EA-6B aircraft software changes. • (U) \$ 142 TERPES: Continue development of Tactical Automation Sanitation capability or similar Multi-Level Security (MLS) device or procedure. • (U) \$ 400 TERPES: Begin software development of Link 16 TADIL J (IBS) to be incorporated into fusion processor. • (U) \$ 133 TERPES: Begin development of advanced communication suite upgrade for Joint interoperability software changes. • (U) \$ 480 TERPES: Begin DIU/COE compliance. • (U) \$ 117 TERPES: Begin Sensitive Secret Compartmented Information (SCI) accreditation. (U) \$ 67 SBIR: 67K portion of extramural program reserved for Small Business Innovation Research assessment in accordance with USX 638 (U)Total \$ 3,939
R-1 Line Item 169	Budget Item Justification

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 1999																
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT																	
7 - Operational System Development	0206313M Marine Corps Communications Systems	C2274																	
<p>(U) FY 2000 Planned Program:</p> <ul style="list-style-type: none"> • (U) \$ 510 MEWSS: Conduct Phase II IOT&E for Electronic Attack module. • (U) \$ 4000 MEWSS: Developmental and Operational Testing. • (U) \$ 822 TPCS Upgrade: In keeping with the evolutionary acquisition strategy, these funds will be used to develop software to enhance the baseline including enhancements to improve the systems interoperability with other systems. • (U) \$ 195 TPCS Upgrade: Systems Engineering and Technical Assistance (SETA). • (U) \$ 500 TERPES: Continue development of TERPES mission planning software to maintain compatibility with the EA-6B aircraft software changes. • (U) \$ 200 TERPES: Continue development of Tactical Automation Sanitation capability or similar Multi-Level Security (MLS) device or procedure. • (U) \$ 100 TERPES: Begin software and hardware integration for Joint Tactical Terminal (JTT). • (U) \$ 582 TERPES: Continue DIJ/COE compliance to reach level 6. • (U) \$ 397 TERPES: Continue development of advanced communications suite for Joint interoperability software changes. • (U) \$ 500 TERPES: Enhance TERPES Fusion Correlator. • (U) \$ 581 RREP: Integrate GOTS/COTS electronic attack (EA) capability (SS-2). (U) Total \$ 8,387 																			
<p>B. (U) <u>Project Change Summary</u></p> <table> <tr> <td>(U) Previous President's Budget</td> <td>FY 1998</td> <td>FY 1999</td> <td>FY 2000</td> </tr> <tr> <td>(U) Adjustments to Previous President's Budget</td> <td>3275</td> <td>4007</td> <td>3865</td> </tr> <tr> <td>(U) Current Budget Submit</td> <td>+109</td> <td>-68</td> <td>+4522</td> </tr> <tr> <td></td> <td>3384</td> <td>3939</td> <td>8387</td> </tr> </table>				(U) Previous President's Budget	FY 1998	FY 1999	FY 2000	(U) Adjustments to Previous President's Budget	3275	4007	3865	(U) Current Budget Submit	+109	-68	+4522		3384	3939	8387
(U) Previous President's Budget	FY 1998	FY 1999	FY 2000																
(U) Adjustments to Previous President's Budget	3275	4007	3865																
(U) Current Budget Submit	+109	-68	+4522																
	3384	3939	8387																
<p>(U) Change Summary Explanation:</p> <p>(U) Funding: FY 98 adjustments are due to minor internal reprogramming. FY 00 adjustments due to prioritization of program's within the Marine Corps.</p> <p>(U) Schedule: N/A</p> <p>(U) Technical: N/A</p>																			
R-1 Line Item 169		Budget Item Justification																	

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February 1999
BUDGET ACTIVITY										PROJECT	
7 - Operational System Development										C2274	
PE NUMBER AND TITLE										0206313M Marine Corps Communications Systems	
		FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost
C. (U) Other Program Funding Summary											
(U) (APPN, BLI #, NOMEMEN)											
(U) PMC BLI 474900 Modification Kits INTEL		4231	0	3695	0	2741	0	2715	0	0	13611
TERPES											
(U) PMC BLI 463600 Modification Kits MEWSS		14300	21291	4965	28010	33800	10346	4363	3220	Cont	Cont
(U) PMC BLI 474900 Modification Kits INTEL		0	3119	11358	2873	0	0	2500	2105	0	21955
TPCS											
(U) PMC BLI 474700 Intelligence Support		0	0	2916	0	0	4041	0	0	0	6957
EQUIPMENT RREP											
(U) O&M				2861			3969				6830
TERPES		2146	2325	2397	2472	2540	2629	0	0	Cont	Cont
TPCS		867	1203	1453	1246	1243	1270	1615	0	1415	10312
(U) Related RDT&E											
(U) (U) PE 0305885G (Tactical Cryptologic Program)											
R-1 Line Item 169										Budget Item Justification	

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1999
BUDGET ACTIVITY 7 - Operational System Development	PE NUMBER AND TITLE 0206313M Marine Corps Communications Systems	PROJECT C2274

D. (U) Schedule Profile

TERPES UPGRADE

EVENT	FY 95	FY 96	FY 97	FY 98	FY 99
ORD Signed	▲ Apr				
Doc Update	▲ May	May-Jun			
MS II LAR	▲ May				
MS I-II	▲ Mar				
CV Delivery	▲ Apr				
VMAQ-CV Det	▲	▲ Aug - Feb			
DT&E			▲ Nov-May		
Interop Test			▲ May		
OT&E			▲ May		
OT Report			▲ Sep		
MS III LAR			▲ Sep-Oct		
MS III				▲ Dec	
IOC				△ Sep	
FOC					△ Mar

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Budget Item Justification

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 1999
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
7 - Operational System Development	0206313M Marine Corps Communications Systems	C2274	

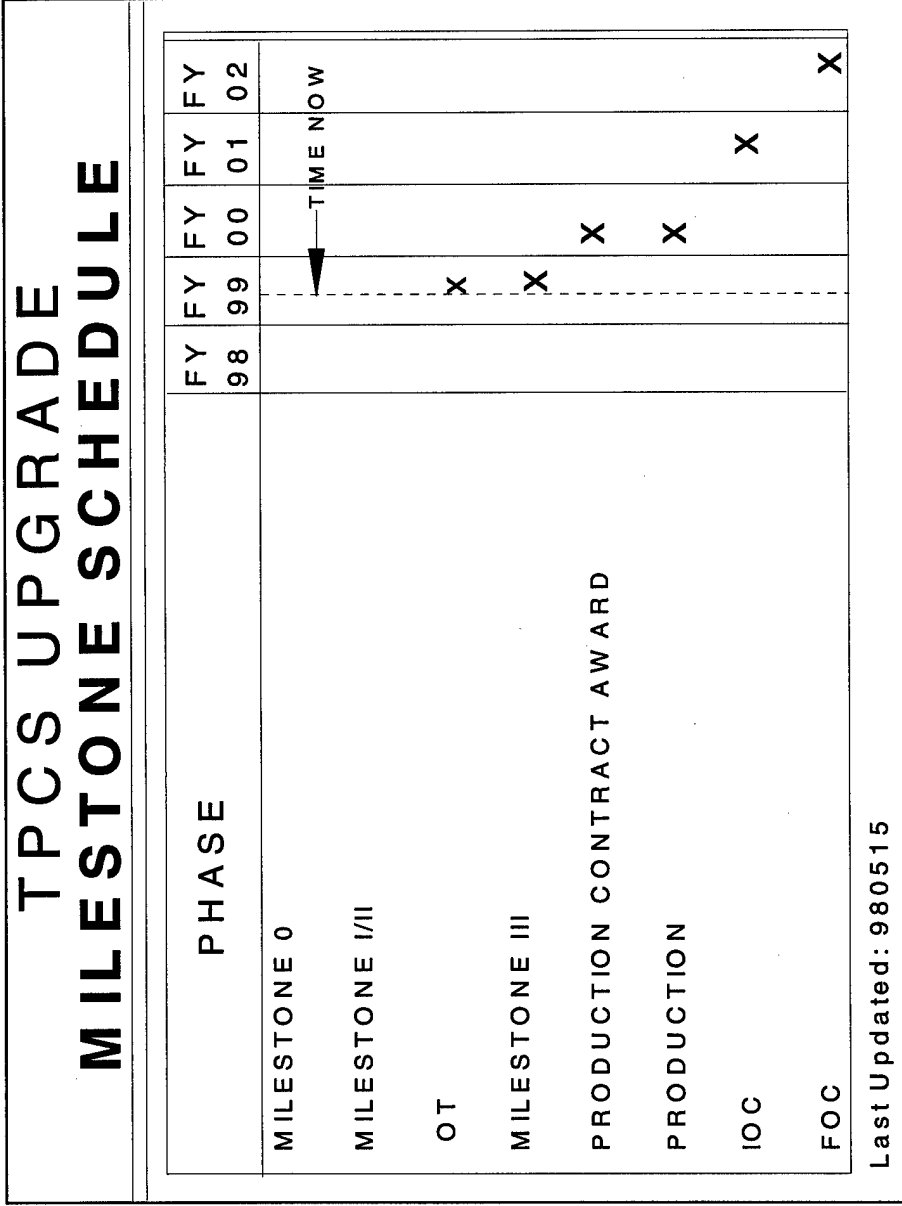
MEWSS Schedule

<div style="display: flex; justify-content: space-between;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">MEWSS-PIP</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">MILESTONE SCHEDULE</div> </div>						
PHASE	FY	FY	FY	FY	FY	FY
MILESTONE 0	98	99	00	01	02	
MILESTONE I/II						
PHASE I OT						
PHASE II OT						
MILESTONE III						
PRODUCTION CONTRACT AWARD						
PRODUCTION						
IOC						
FOC						

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 1999
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
7 - Operational System Development	0206313M Marine Corps Communications Systems	C2274	

TPCS Schedule



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Budget Item Justification

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 1999
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
7 - Operational System Development	0206313M Marine Corps Communications Systems	C2274	

RREP Schedule

RREP				
MILESTONE SCHEDULE				
PHASE	FY	FY	FY	FY
MS II (SS-2)	98	99	00	01
MS III (SS-2)	98	99	00	01
ELECTRONIC ATTACK (EA) MODULE	98	99	00	01
MS 0/I (SS-3)	98	99	00	01
REMOTE EA CAPABILITY	98	99	00	01
IOC/FOC (SS-2)	98	99	00	01
MS II (SS-3)	98	99	00	01
MS III (SS-3)	98	99	00	01

Budget Item Justification

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE	February 1999
BUDGET ACTIVITY		PE NUMBER AND TITLE									PROJECT
7 - Operational System Development		0206313M Marine Corps Communications Systems									C2274
CSC	CPFF	Oct 97	548	548	0	164	187	197	0	548	
TERPES:											
NAWCWPNS,	WR	Oct 96			0	32	20	20	CONT	CONT	
Pt Mugu, CA											
Test and Evaluation Organizations											
MEWSS:											
Lockheed Martin	CPFF	OCT 00	4000	4000	0	0	0	4000	0	4000	
Fed Sys, Owego											
TPCS Upgrade:											
TERPES:											
NAWCWPNS	RCP	Oct 96	557	557	0	557	0	0	0	557	
Pt Mugu, CA											
Subtotal Product Development											
Subtotal Support and Management											
Subtotal Test and Evaluation											
Total Project											
				Total							
				Prior to							
				FY 1998	FY 1998	FY 1999	FY 2000	Budget to	Total		
					2631	3732	4170	Complete	Program		
					196	207	217	CONT	CONT		
					557	0	4000	CONT	CONT		
					3384	3939	8387	CONT	CONT		

C. (U) Funding Profile: Not Applicable.

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Budget Item Justification

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE February 1999	
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT	
7 - Operational System Development		0206313M Marine Corps Communications Systems								C2276	
COST (In Millions)		FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
C2276 Communications Switching and Control System		1850	1888	1841	229	0	0	0	0	0	5808
Quantity of RDT&E Articles											
<p>A. (U) Mission Description and Budget Item Justification: This program consists of four interrelated projects: Unit Level Circuit Switch Product Improvement Program (ULCS PIP), Digital Technical Control (DTC), Tactical Data Network (TDN), and Defense Message System (DMS). Together, these systems form an integrated, digital communications backbone for a deployed Marine Air Ground Task Force (MAGTF) which has the capability to manage, control, switch, and multiplex networks providing voice, data, message, imagery, facsimile, and video services to subscribers.</p> <p>(U) The ULCS PIP will upgrade the ULCS circuit switches (AN/TTC-42 Central Office Telephone radio and switchboard SB-3865). The ULCS PIP is a competitive procurement of special purpose circuit card assemblies (CCAs) produced from a government-owned technical data package. The additional CCAs will provide improved access to fixed plant analog and trunk connections. Additional enhancements provide STU-III secure telephone interfaces in the AN/TTC-42 and SB-3865. The ULCS PIP requires low risk/medium technology engineering and development prior to build-to-print production.</p> <p>(U) The TDN augments existing MAGTF communications infrastructure to provide the commander an integrated data network forming the communication backbone for MAGTF tactical data systems and Defense Message System. The TDN consists of a network of Gateways and Servers interconnected with one another and their subscribers via a combination of common user long-haul transmission systems, local area networks, single channel radios, and the switched telephone system. The network provides its subscribers with basic data transfer and switching services; access to strategic, supporting establishment, joint, and other service component tactical data networks; network management capabilities; and value-added services such as message handling, directory services, file sharing, facsimile handling, and terminal emulation support. Required functionality was separated into three blocks of capabilities due to the leading edge technology required in the Operational Requirement Document (ORD). This evolutionary acquisition strategy and funding provide for development of additional capabilities which compose the Block II upgrade of the system.</p> <p>(U) The DTC facilitates the installation, operation, restoration, and management of individual circuits and digital links consisting of many multiplexed circuits. It provides the primary interface between subscriber systems/networks within a local area and long-haul multichannel transmissions systems to transport voice, message, data, and imagery traffic. It can add, drop and insert digital circuits into multiplexed groups; provide a source of stable timing to connected equipment; condition circuits; and perform analog/digital, 2-wire/4-wire, and signaling conversions. It contains the monitoring, testing, and patching equipment required by technical controllers to troubleshoot and restore faulty circuits and links. This funding provides for the development of interfaces to new technology transmission systems.</p>											

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Budget Item Justification

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 1999
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
7 - Operational System Development	0206313M Marine Corps Communications Systems	C2276	
<p>(U) DMS is an OSD-mandated program to integrate Automatic Digital Network (AUTODIN) and E-Mail into a single, secure, DoD message communications system. DMS will expand writer-to-reader connectivity, support, and message security services. Organizations and individuals will be able to create, edit, send, receive, read, and process organizational and individual messages, secured with end-to-end protection, direct from desktop terminals/personal computers in their workspaces. DMS will do everything our current Banyan E-Mail and AUTODIN systems do with the following additional capabilities: connectivity to all users in DoD.</p>			
PROGRAM ACCOMPLISHMENTS AND PLANS:			
(U) FY 1998 Accomplishments:			
• (U)\$ 379	DTC: Development and Engineering system technology upgrades. Achieve MS III decision.		
• (U)\$ 318	DMS: Support software and hardware integration/testing. Incorporate evolutionary security products into the unclassified DMS architecture within a Marine Corps-unique network infrastructure.		
• (U)\$ 1153	TDN: Begin developing TDN on Block II. Achieve MS III decision block I.		
(U)Total \$ 1,850			
(U) FY 1999 Planned Program:			
• (U)\$ 387	DTC: Engineering/testing system technology upgrades..		
• (U)\$ 325	DMS: Support software and hardware integration/testing. Incorporate evolutionary security products into the unclassified DMS architecture within a Marine Corps-unique network infrastructure.		
• (U)\$ 1144	TDN: Continue development TDN of Block II and software/hardware integration/testing.		
• (U)\$ 32	SBIR: Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638		
(U)Total \$ 1,888			
(U) FY 2000 Planned Program:			
• (U)\$ 549	DTC: Developmental/Interoperability testing of ATM upgrade, obtain approval for ATM upgrade		
• (U)\$ 198	DMS: Support software and hardware integration/testing. Incorporate evolutionary security products into the unclassified DMS architecture within a Marine Corps-unique network infrastructure.		
• (U)\$ 1094	TDN: Continue TDN BLK II development and S/W and H/W Integration testing. Achieve milestone III Decision for Block II		
(U)Total \$ 1,841			
R-1 Line Item 169		Budget Item Justification	

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February 1999
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT	
7 - Operational System Development		0206313M Marine Corps Communications Systems								C2276	
B. (U) Project Change Summary		<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>							
(U) Previous President's Budget		1959	2106	1746							
(U) Adjustments to Previous President's Budget		-109	-218	+95							
(U) Current Budget Submit		1850	1888	1841							
(U) Change Summary Explanation:											
(U) Funding:		FY 98/99 changes are due to minor affordability adjustments, revised economic assumption, CASS reductions.									
		FY 00 adjustment is due to prioritization of programs within the Marine Corps, minor affordability adjustments, and non pay inflation adjustment.									
(U) Schedule:		N/A									
(U) Technical:		N/A									
C. (U) Other Program Funding Summary		<u>FY1998</u>	<u>FY1999</u>	<u>FY2000</u>	<u>FY2001</u>	<u>FY2002</u>	<u>FY2003</u>	<u>FY2004</u>	<u>FY 2005</u>	<u>To Complete</u>	<u>Total Cost</u>
(U) PMC BLI 463400 Communications Switching and Control Systems											
DTC		11293	18330	33704	0	0	0	0	0	0	68603
TDN		24707	49606	24063	11040	204	253	313	386	0	115246
ULCS		0	2943	0	0	0	0	0	0	0	29527
DMS		7120	4475	7358	3197	0	0	0	0	0	26394
(U) O&M											
DTC		0	0	208	0	219	0	0	0	0	427
TDN		47	0	141	141	0	0	0	0	0	329
DMS		211	367	216	220	299	242	0	0	0	1555
(U) Related RDT&E : N/A											

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Budget Item Justification

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Budget Item Justification

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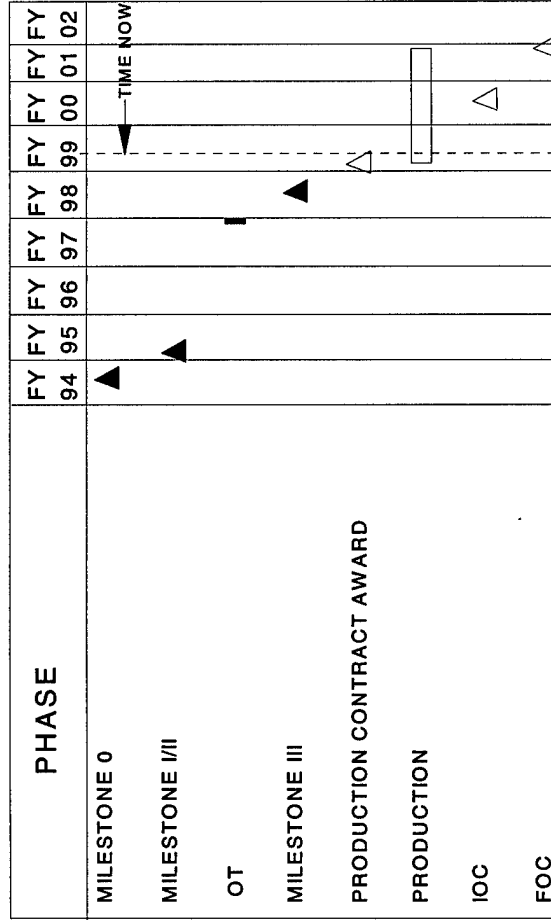
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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1999
BUDGET ACTIVITY 7 - Operational System Development	PE NUMBER AND TITLE 0206313M Marine Corps Communications Systems	
PROJECT C2276		

(U) Schedule Profile:

DTC Schedule

DTC MILESTONE SCHEDULE



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Budget Item Justification

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1999
BUDGET ACTIVITY 7 - Operational System Development	PE NUMBER AND TITLE 0206313M Marine Corps Communications Systems	PROJECT C2276

TDN Schedule

Tactical Data Network (TDN)

TDN MILESTONE SCHEDULE

PHASE	FY 94	FY 95	FY 96	FY 97	FY 98	FY 99	FY 00	FY 01	FY 02
MILESTONE 0	▲								
MILESTONE I/II		▲			▲				
BLOCK I OT					▲				
MILESTONE III					▲				
PRODUCTION CONTRACT AWARD						▲			
BLOCK I FIELDDED							▲		
BLOCK II FIELDDED								▲	
BLOCK III FIELDDED									▲
IOC								▲	
FOC									▲

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1999
BUDGET ACTIVITY 7 - Operational System Development	PE NUMBER AND TITLE 0206313M Marine Corps Communications Systems	PROJECT C2276

DMS Schedule

PHASE	FY 94	FY 95	FY 96	FY 97	FY 98	FY 99	FY 00	FY 01
MAISRC I/II	△							
SBU IOC			△					
IOT&E				△				
MAISRC IPR				△				
Secret IOC				△				
TS/SCI IOC					△			
MAISRC III						△		
SBU FOC							△	
Secret FOC								△
TS/SCI FOC								△

← TIME NOW

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Budget Item Justification

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE	February 1999
BUDGET ACTIVITY		PE NUMBER AND TITLE									PROJECT
7 - Operational System Development		0206313M Marine Corps Communications Systems									C2276
A. (U) Project Cost Breakdown											
Contractor Engineering Support		FY 1998	FY 1999	FY 2000							
Development Test Evaluation		1238	317	320							
Program Management Support		335	325	412							
Total		277	1246	1109							
		1850	1888	1841							
B. Budget Acquisition History and Planning Information											
Performing Organizations											
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1998	FY 1998	FY 1999	FY 2000	Budget to Complete	Total Program	
Product Development Organizations											
TDN:											
CSC	C/CPFF	Oct 97	10160	10160	9215	945	0	0	0	10160	
Dumfries, VA											
DTC:											
ESC, USAF	C/FFP/MIP	Oct 97	1159	1159	866	293	0	0	0	1159	
Hanscom AFB, MA											
MITRE	CPFF/MIPR	Oct 98	637	637	0	0	317	320	0	637	
Support and Management Organizations											
TDN:											
MCTSSA, Camp Pendleton, CA	WR	Oct 97	785	785	249	210	300	26	0	785	
MITRE	CPFF/MIPR	Oct 98	1852	1852	0	0	814	1038	0	1852	
MCSC, Quantico, VA	WR	Oct 98	120	120	0	0	30	30	60	120	
SBIR	UNKNOWN	TBD	32	32	0	0	32	0	0	32	
DTC:											
R-1 Line Item 169										Budget Item Justification	

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE	February 1999
BUDGET ACTIVITY		PE NUMBER AND TITLE									PROJECT
7 - Operational System Development		0206313M Marine Corps Communications Systems									C2276
		WR	Oct 98	234	234	35	59	60	10	70	234
MCTSSA, Camp Pendleton, CA		WR	Oct 98	234	234	35	59	60	10	70	234
MCCDC Quantico, VA		WR	Oct 98	59	59	31	8	10	5	5	59
Test and Evaluation Organizations											
DTC:											
TBD		MIPR	Oct 99	427	427	0	0	0	214	213	427
DMS:											
MCTSSA, Camp Pendleton, CA		WR	Oct 98	1087	1087	0	335	325	198	229	1087
Subtotal Product Development											
Subtotal Support and Management											
Subtotal Test and Evaluation											
Total Project											
						Total Prior to FY 1998	FY 1998	FY 1999	FY 2000	Budget to Complete	Total Program
						10374	1238	317	320	0	12249
						315	277	1246	1109	135	3082
						0	335	325	412	442	1514
						10689	1850	1888	1841	577	16845
C. (U) Funding Profile: Not Applicable											
										R-1 Line Item 169	Budget Item Justification

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February 1999	
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT		
7 - Operational System Development		0206313M Marine Corps Communications Systems								C2277		
C2277	Systems Engineering and Integration	COST (In Millions)	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
			1922	7155	6966	6762	6906	6624	6628	6466	Continuing	Continuing
Quantity of RDT&E Articles												
<p>A. (U) Mission Description and Budget Item Justification:</p> <p>This project provides funds for engineering, test, and evaluation activity which ensures that the systems being developed within the Program Element (PE) employ consistent standards for interoperability and, to the maximum extent feasible, use hardware and software which is uniform across programs.</p> <ol style="list-style-type: none"> 1. The Marine Air-Ground Task Force Command, Control, Communications, Computers, and Intelligence Systems Engineering and Integration, Coordination. (MAGTF C4I SE&IC) subproject is a non-acquisition effort which provides centralized planning and execution of MAGTF C4I Systems; it is also used to develop and test common hardware and software for use in MAGTF C4I Systems; MAGTF C4I SE&I also funds USMC participation in joint planning and technical standards development. MAGTF SE&IC changes name to MAGTF SEI&c in FY00. 2. Joint Warrior Interoperability Demos (JWID) is a JCS-mandated program to demonstrate new C4I interoperability concepts for the warrior. JWID offers the opportunity for demonstrations of evolving technologies in interoperability, information dissemination, fusing and digital communications. 3. The Joint Interoperability of Tactical Command and Control Systems (JINTACCS) is a Joint Chiefs-of-Staff (JCS)-mandated program for joint development, implementation, and testing of data links under the direction of the Joint Interoperability Engineering Organization (JIEO). 4. All Service Combat Identification Evaluation Team (ASCIET) conducts multi-service tactical air-to-air and surface-to-air evaluations, examines air-to-surface and surface-to-surface combat identification capabilities and provides an environment to exercise and examine developmental combat identification systems. USMC participation in ASCIET is mandated by an existing all service MOA (940914). 5. Common Computer Resources mission - Central and standardized management and acquisition of all common computer hardware and infrastructure adopting the Joint Defense Information Infrastructure (DII) Common Operating Environment (COE) with consolidated Integrated Logistics Support. Ensure the environment remains in synchronization with computer hardware technology hardware improvements. The mission supports the Commandant's Planning Guidance and input to the Marine Corps Master Plan. 												
R-1 Line Item 169										Budget Item Justification		

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 1999
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
7 - Operational System Development	0206313M Marine Corps Communications Systems	C2277	
PROGRAM ACCOMPLISHMENTS AND PLANS:			
(U) FY 1998 Accomplishments:			
• (U) \$	110	JWID: Participated in JWID, a JCS-mandated program, to demonstrate new C4I interoperability concepts. JWID-98 offers the opportunity for demonstrations of evolving technologies in interoperability, information dissemination, fusing and digital communications.	
• (U) \$	0	JWID: This effort forward financed with \$257 FY97 funds from this project and PE.	
• (U) \$	0	MAGTF SE&I: Continued DII COE migration to include enhanced open system, capabilities, distributed directory service, distributed file service with data replication, enhanced security, and modern desktop manger to include user configured icon and toolbars. This effort forward financed with \$322 FY97 funds from this project and PE.	
• (U) \$	1783	MAGTF SEI&C: Continued to provide systems engineering to centralize management, ensure proper testing, and provide integrated support planning of hardware.	
• (U) \$	0	MAGTF SEI&C: Continued to provide engineering and technical support in support of the configuration management of the MAGTF C4I system and its igration to the DII COE. Provide analyses, studies, and reviews in the development of an integrated migration strategy. Continue to provide systems engineering efforts to implement the emerging Joint Technical Architecture. Provide interoperability testing/certification of MAGTF C4I systems. This effort forward financed with \$1322 FY97 funds from this project.	
• (U) \$	0	JINTACCS: Support the JINTACCS program with \$1450, by providing system engineering efforts to implement emerging standard and provide interoperability testing/certification of MAGTF C4I systems.	
• (U) \$	29	JINTACCS OPNET Software for modeling of USMC systems	
(U)Total \$	1,922		
(U) FY 1999 Planned Program:			
• (U) \$	720	JWID: Participate in JWID, a JCS-mandated program, to demonstrate new C4I interoperability concepts. JWID-99 offers the opportunity for demonstrations of evolving technologies in interoperability, information dissemination, fusing and digital communications.	
• (U) \$	2289	MAGTF SEI&C: Initiate Independent Verification and Validation (IV&V) to certify that all MAGTF C4I systems are Year 2000 complaint.	
• (U) \$	1287	MAGTF SEI&C: Continue to provide engineering and technical support in the support of configuration management of the MAGTF C4I system and its migration to the DII COE. Provide analyses, studies, and reviews in the development and implementation of an integrated migration strategy. Continue to provide systems engineering efforts to implement the emerging Joint Architecture. Provide interoperability testing/certification of MAGTF C4I systems.	
• (U) \$	1354	JINTACCS: Support the JINTACCS program by providing system engineering efforts to implement emerging standard and provide interoperability testing/certification of MAGTF C4I systems.	
• (U) \$	51	ASCIET: Support and management to monitor and participate in the development of the Joint Program.	
• (U) \$	1151	ASCIET: Direct support to conduct yearly combat identification evaluations.	
		R-1 Line Item 169	Budget Item Justification

R-1 Line Item 169

Budget Item Justification

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 1999
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
7 - Operational System Development	0206313M Marine Corps Communications Systems	C2277	
<ul style="list-style-type: none"> (U) \$ 303 SBIR: Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638 (U)Total \$ 7,155 			
(U) FY 2000 Planned Program:			
<ul style="list-style-type: none"> (U) \$ 1380 JWID: Provide management, engineering and technical support in preparation for JWID-00, a JCS-mandated program. USMC will support fielding of "GOLDEN NUGGET" from JWID-99 during JWID-00 exercise. JWID offers the opportunity to demonstrate and evaluate emerging technologies. (U) \$ 1345 JINTACCS: Participate in JINTACCS, a JCS-mandated program aimed at ensuring interoperability of tactical systems. Provide analysis, engineering and technical support in developing joint standards. Provides interoperability testing/certification in support of C4I systems. Provide technical support in various joint programs and ACTD's. (U) \$ 2497 MAGTF SEI&C: Provide engineering and technical support for configuration management of MAGTF C4I systems and its migration to the DII COE. Provide analysis, studies and reviews in the development and implementation of the COE migration strategy. Provide engineering support for remaining Y2K problems within MAGTF C4I systems. (U) \$ 1685 CCR MCHS: Provide for research, evaluation, test and selection of computer hardware products for the Marine Corps Common Hardware Suite (MCHS). Develop MCHS system specifications and baselines; research and analyze computer technologies and hardware; conduct performance, compatibility and environment testing; support commercial product selection and application. (U) \$ 59 ASCIET: USMC fair share of ASCIET exercise per established MOA. (U)Total \$ 6,966 			
B. (U) Project Change Summary			
(U) Previous President's Budget	FY 1998	FY 1999	FY 2000
(U) Adjustments to Previous President's Budget	189	6500	5716
(U) Current Budget Submit	+1733	+655	+1250
	1922	7155	6966
(U) Change Summary Explanation:			
(U) Funding: FY98 reprogramming for consolidation of support contract. FY99/00 changes due to realignment of programs within MarCorSysCom, and Non Pay Inflation adjustments.			
(U) Schedule: N/A			
(U) Technical: N/A			
		R-1 Line Item 169	Budget Item Justification

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February 1999	
BUDGET ACTIVITY		PE NUMBER AND TITLE									PROJECT	
7 - Operational System Development		0206313M Marine Corps Communications Systems									C2277	
C. (U) Other Program Funding Summary												
(APPN, BLI #, NOMEN)												
(U) CCR PMC (BLI#463000)		FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Complete	To	Total Cost
		0	0	102814	88001	68380	63066	62153	68542	CONT	CONT	
(U) Related RDT&E												
(U) PE 0604817A												
(U) PE 0206623M, Marine Corps Ground Combat/Supporting Arms Systems												
D. (U) Schedule Profile:												
Not Applicable												
R-1 Line Item 169										Budget Item Justification		

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)				DATE	February 1999	PROJECT
BUDGET ACTIVITY		PE NUMBER AND TITLE			C2277	
7 - Operational System Development		0206313M Marine Corps Communications Systems				
A. (U) Project Cost Breakdown		FY 1998	FY 1999	FY 2000		
Software Development/Integration Testing		139	200	375		
Civilian Salaries		416	426	435		
Program Management Support		628	1933	1357		
Systems Engineering PM Support		0	2144	2525		
Development Support Equipment Acquisition		739	806	1065		
Test/Certification		0	1646	1209		
Total		1922	7155	6966		
B. Budget Acquisition History and Planning Information						
Performing Organizations						
Contractor or Government	Contract Method/	Award or	Performing	Project	Total	Total
Performing Activity	Type or Funding	Obligation	Activity	Office	Prior to	Program
	Vehicle	Date	EAC	EAC	FY 1998	FY 1999
Product Development Organizations						
JWID:						
MCTSSA, Camp	WR	Oct97		0	110	200
Pendleton, CA						300
HQMC	WR	Oct 99		0	0	580
Arlington, VA						CONT
CCR:						
TBD	TBD	Jan 00		0	0	133
TBD	TBD	Jan 00		0	0	152
JINTACCS						CONT
CECOM FT	SS	Oct 98	29	29	0	0
MONMOUTH, NJ						29
Support and Management Organizations						
JWID:						
				R-1 Line Item 169	Budget Item Justification	

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE		February 1999		PROJECT	
BUDGET ACTIVITY				PE NUMBER AND TITLE											
7 - Operational System Development				0206313M Marine Corps Communications Systems								C2277			
Logicon, Stafford, VA				C/FFP	Oct 98					0	294	300	CONT	CONT	
TBD				TBD	TBD					0	226	200	CONT	CONT	
MAGTF SE&I:															
CECOM, Fort Monmouth				WR	Oct 98	700	700			0	175	175	350	700	
N.J.															
CCR:															
Logicon, Stafford VA				C/FFP	Oct 99					0	0	1048	CONT	CONT	
MCSC, Quantico, VA				WR	Oct 99					0	0	38	CONT	CONT	
ASCIET:															
Eglin AFB				MIPR	Oct 98					0	1202	59	CONT	CONT	
Test and Evaluation Organizations															
MAGTF SEIC:															
Logicon, Stafford, VA				CFFP	Oct 99	8509	8509			1783	3401	2322	1003	8509	
JINTACCS:															
Logicon, Stafford, VA				C/CPFF	Oct 98					649	0	1319	1310	CONT	CONT
MCTSSA, Camp				WR	Oct 97					0	35	35	CONT	CONT	
Pendleton, CA															
CCR:															
TBD				TBD	Jan 00					0	0	314	CONT	CONT	
SBIR						303	303			0	303	0	0	303	
								</							

C. (U) Funding Profile: Not Applicable.

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Budget Item Justification

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February 1999
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT	
7 - Operational System Development		0206313M Marine Corps Communications Systems								C2278	
COST (In Millions)		FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
C2278	Air Defense Weapons Systems	744	2001	9759	9350	9698	11537	2741	3618	Continuing	Continuing
Quantity of RDT&E Articles											
<p>A. (U) Mission Description and Budget Item Justification:</p> <p>This project encompasses two sub-element programs which are part of the Integrated Air Defense System for the Marine Corps.</p> <ol style="list-style-type: none"> 1. The Expeditionary Air Defense System (EADS) is the Marine Corps' low altitude ground based air defense system. Upgrades include mobility enhancements and expeditionary air defense improvements. Primarily, the Continuous Wave Acquisition Radar (CWAR) is the only sensor organic to the Marine Corps capable of providing low altitude target acquisition in a high clutter environment. 2. Combat ID (CID) will provide the ability to distinguish friends, foes, and neutrals on the battlefield through the use of situation awareness and target identification. 3. The Cooperative Engagement Capability (CEC) enables all ECE-equipped, Anti-Air Warfare (AAW) weapons systems in a battle force to operate as a single, distributed AAW weapon system. This is accomplished providing timely sharing of fire control quality sensor data, correlated identification data, and AAW weapon system management status via a Data Distribution System (DDS). The data is processed Independently the Cooperative Engagement Processor (CEP) on-board each Cooperating Unit (CU) to construct a detailed tract and status database in real time to provide required remote data to and from the local AAW weapon system elements (hardware and software modified for CEC). In this manner, each CU of a battle force can operate cooperatively with the other CUs, taking advantage of diverse locations and aspect angles, various AAW system capabilities, and degrees of availability by sharing sensor data, and coordinating engagements, fire control illuminators, and AAW missiles. <p>PROGRAM ACCOMPLISHMENTS AND PLANS:</p> <p>(U) FY 1998 Accomplishments:</p> <ul style="list-style-type: none"> • (U) \$ 744 EADS: Continued pursuing ECPs for correcting hardware and software deficiencies thereby maintaining CWAR system viability. <p>(U) Total \$ 744</p>											
R-1 Line Item 169										Budget Item Justification	

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 1999
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
7 - Operational System Development	0206313M Marine Corps Communications Systems	C2278	

(U) FY 1999 Planned Program:	
• (U) \$ 1,964	EADS: Identification Friend or Foe (IFF) continuous wave acquisition radar integration.
• (U) \$ 37	Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.
(U)Total \$ 2,001	
(U) FY 2000 Planned Program:	
• (U) \$ 3,600	CEC: Initiate development of a land based CEC Engineering Design Model.
• (U) \$ 1,000	CEC: Initiate design and development of a land based CEC antenna.
• (U) \$ 197	CEC: Certify AN/TPS-59(V)3 adaptive layer software.
• (U) \$ 500	CEC: Continue UPX-27(IFF) adaptive layer software development.
• (U) \$ 500	CEC: Initiate design of combat system adaptive layer interface.
• (U) \$ 700	CEC: Conduct Developmental Testing.
• (U) \$ 200	CEC: Program support of provide program documentation for MS II.
• (U) \$ 400	CEC: Program Management Support.
• (U) \$ 400	CID: Test and evaluate systems currently available COTS for applicability.
• (U) \$ 1,400	CID: Demonstration & Validation of systems.
• (U) \$ 500	CID: Conduct Studies to investigate feasibility of using various fielded systems to fulfill some CID requirements.
• (U) \$ 312	CID: Contractor Management.
• (U) \$ 50	CID: TAD.
(U)Total \$ 9,759	

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Budget Item Justification

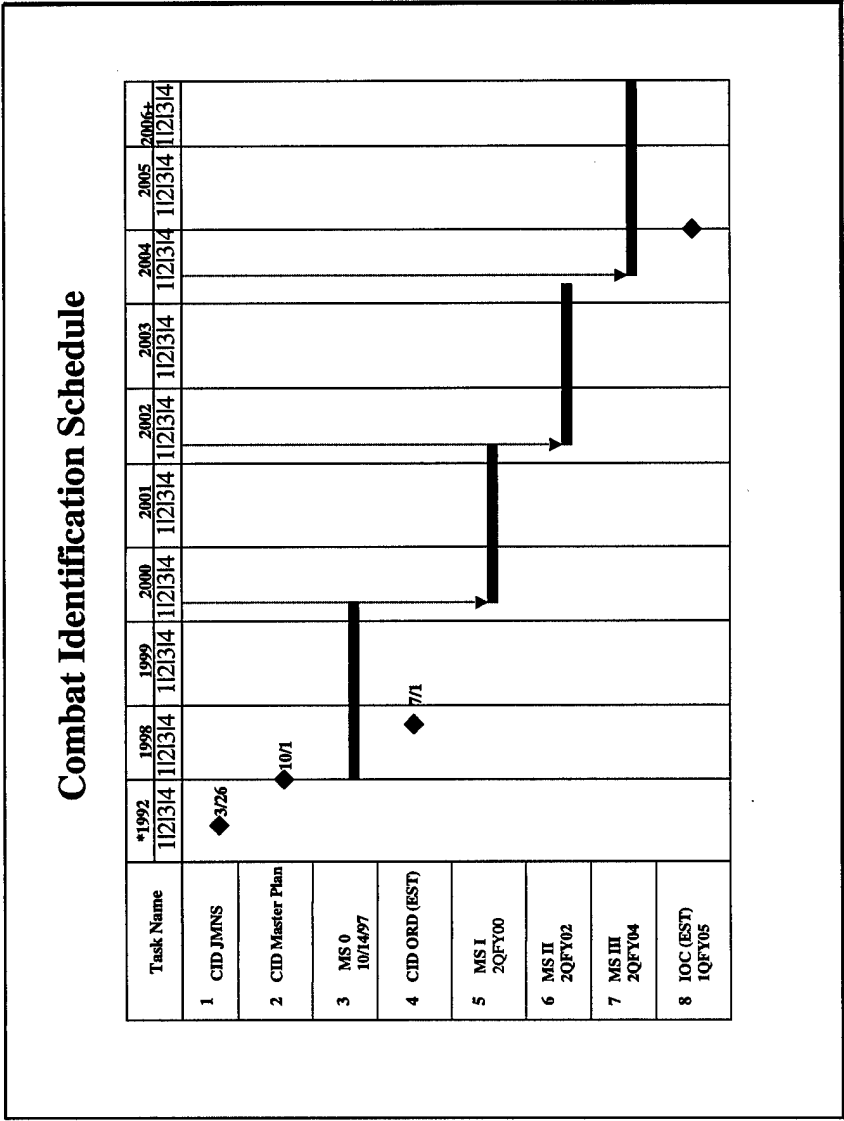
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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 1999
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
7 - Operational System Development	0206313M Marine Corps Communications Systems	C2278	

D. (U) Schedule Profile

CID Schedule:



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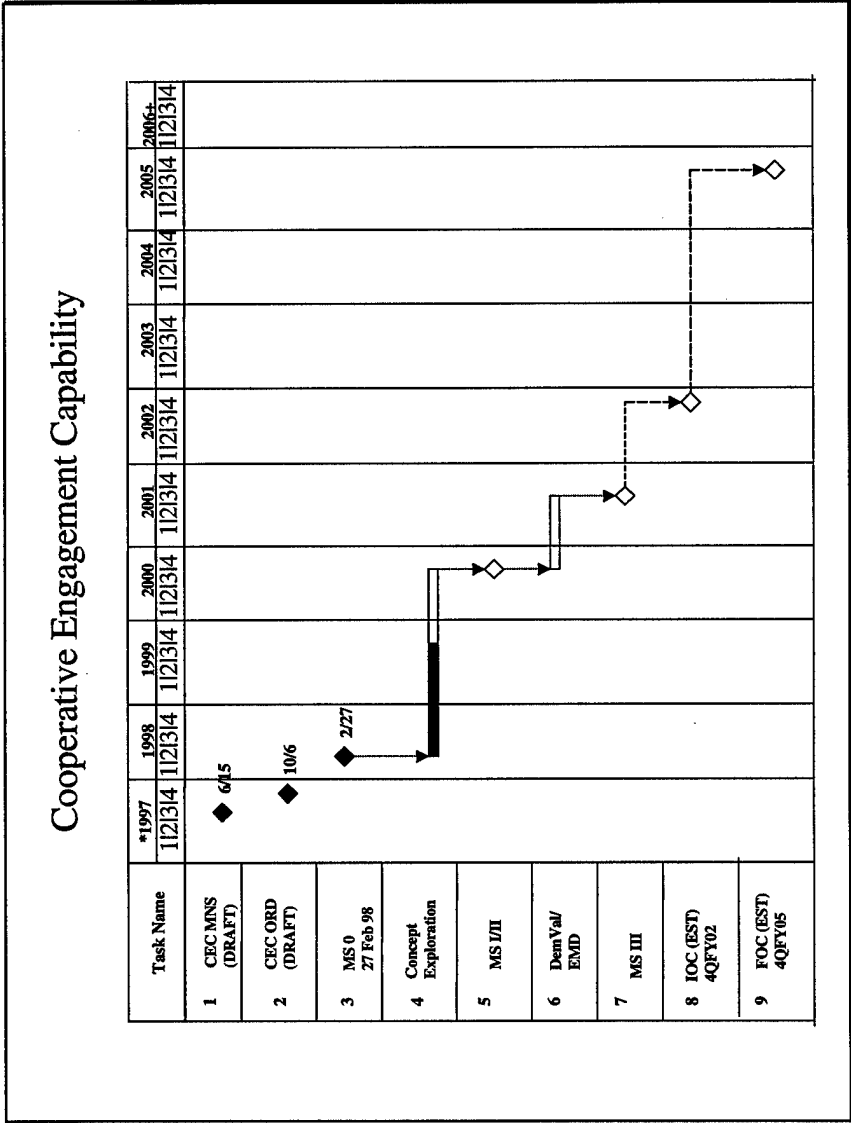
Budget Item Justification

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 1999
BUDGET ACTIVITY		PROJECT	
7 - Operational System Development		C2278	
		PE NUMBER AND TITLE	
		0206313M Marine Corps Communications Systems	

CEC Schedule:



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Budget Item Justification

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE _____

February 1999

BUDGET ACTIVITY

7 - Operational System Development

PE NUMBER AND TITLE

0206313M Marine Corps Communications Systems

PROJECT

C2278

<u>A. (U) Project Cost Breakdown</u>	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
a. Program Management/Travel	103	10	400
b. System Design	0	0	750
c. Program Management Support Services	60	0	200
d. Primary Hardware Development	0	0	4600
e. Software Development	0	0	800
f. CEC Training Exercise Support to FMF	0	0	347
g. Systems Engineering	581	1991	2662
Total	744	2001	9759

B. Budget Acquisition History and Planning Information

Performing Organizations

[illegible]

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Budget Item Justification

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE	February 1999		
BUDGET ACTIVITY			PE NUMBER AND TITLE					PROJECT					
7 - Operational System Development			0206313M Marine Corps Communications					C2278					
			Systems										
TBD	CPFF	OCT 99					0	0	0	1000	CONT.	CONT.	
TBD	CPFF	OCT 99					0	0	0	4000	CONT.	CONT.	
TBD	CPFF	OCT 99					0	0	0	200	CONT.	CONT.	
TBD	CPFF	OCT 99					0	0	0	497	CONT.	CONT.	
Support and Management Organizations													
EADS:													
MCSC, Quantico, VA	RCP	JAN 98	60				0	60	0	0	0	60	
CECOM, Ft. Monmouth, NJ	MIPR	DEC 97	21				0	21	0	0	0	21	
CEC:													
MCTSSA	WR	OCT 99					0	0	0	250	CONT.	CONT.	
NSWC, Crane, IN	WR	OCT 99					0	0	0	850	CONT.	CONT.	
NSWC, Dahlgren, VA	WR	OCT 99					0	0	0	100	CONT.	CONT.	
TBD	FFP	OCT 99					0	0	0	200	CONT.	CONT.	
Test and Evaluation Organizations													
Government Furnished Property													
Contract													
Item Description	Method/Type or Funding Vehicle	Award or Obligation Date	Delivery Date	Total		FY 1998		FY 1999		FY 2000		Total	
				Prior to FY 1998				Budget to Complete		Program			
Product Development Property													
Support and Management Property													
Test and Evaluation Property													
R-1 Line Item 169													
Budget Item Justification													

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE

February 1999

BUDGET ACTIVITY

PE NUMBER AND TITLE

7 - Operational System Development

0206313M Marine Corps Communications

PROJECT

C2278

	<u>Total Prior to FY 1998</u>	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>Budget to Complete</u>	<u>Total Program</u>
Subtotal Product Development		663	2001	8359	CONT.	CONT.
Subtotal Support and Management		81	0	1400	CONT.	CONT.
Subtotal Test and Evaluation		0	0	0	0	0
Total Project		744	2001	9759	CONT.	CONT.

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Budget Item Justification

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE		February 1999	
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT			
7 - Operational System Development		0206313M Marine Corps Communications Systems								C2315			
COST (In Millions)		FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost		
C2315	Training Devices/Simulators	7203	9368	8850	4881	9021	12342	5093	491	Continuing	Continuing		
Quantity of RDT&E Articles													
<p>A. (U) Mission Description and Budget Item Justification:</p> <p>(U) Training simulators supported by this program element include Joint Simulation System (JSIMS), Range Instrumentation Systems (RIS), and Combat Vehicle Appended Trainer (CVAT). These training systems provide tactical weapons and decision-making skill training from entity level through Marine Air-Ground Task Force (MGTF) staff level. Together these systems will be interoperable and will allow for mission planning, mission rehearsal and concept evaluation in a valid synthetic environment with objective, timely feedback. Through live, virtual and constructive simulation, the Marine Corps will have the means to train jointly, educate, develop doctrine and tactics, formulate and assess operational plans, assess warfighting situations and define operational requirements.</p> <p>(U) PROGRAM ACCOMPLISHMENTS AND PLANS:</p> <p>(U) FY 1998 Accomplishments:</p> <ul style="list-style-type: none"> • (U) \$ 5001 JSIMS: Provided technical expertise to the US Army, US Navy and US Air Force in the development of the Marine Corps unique simulation requirements. Completed development of software Build 0 products within Maritime Domain, and completed program system level specification and detailed software requirements. • (U) \$ 1,323 JSIMS: Completed development of unit level Conceptual Models for software build 0 and build 1 and continue to develop Conceptual Models for software builds 2 and 3. Completed candidate list of USMC simulations to interface. • (U) \$ 170 JSIMS: Completed USMC input to Joint Level Test and Evaluation Master Plan and provided technical expertise to the Test Planning Group to provide input for USMC unique system test requirements. • (U) \$ 430 JSIMS: Completed development of platform level Conceptual models for software builds 0 and build 1. Continued development of platform level conceptual models for software builds 2 and 3. • (U) \$ 279 RIS: Completed After Action Report (AAR) software capabilities. (U) Total \$ 7,203 													
R-1 Line Item 169										Budget Item Justification			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 1999
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
7 - Operational System Development	0206313M Marine Corps Communications Systems	C2315	
(U) FY 1999 Planned Program:			
• (U) \$ 298	JSIMS: Provide Marine Corps funding to CECOM for the development of the USMC specific Test and Evaluation master plan and provide technical expertise to the JSIMS test planning group for the Build 1 demonstration.		
• (U) \$ 6881	JSIMS: Continue to provide technical expertise to the US Army, US Navy and US Air Force in the development of USMC specific requirements. Complete development of USMC requirements for software build 1. Procure Test hardware for Camp Lejeune in preparation for Collaborative Event.		
• (U) \$ 400	JSIMS: Provide USMC Funding to Naval Air Warfare Center to continue development of JSIMS Build 2 and Build 3 conceptual models for USMC.		
• (U) \$ 1000	JSIMS: Provide USMC Funding to US Army STRICOM to begin development of USMC Tactical Intelligence Systems.		
• (U) \$ 528	JSIMS: Support development of USMC notional hardware configurations and participate in the Enterprise development of USMC C4I interface requirements.		
• (U) \$ 261	SBIR: Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.		
(U)Total \$ 9,368			
(U) FY 2000 Planned Program:			
• (U) \$ 4622	JSIMS: Continue to provide technical expertise to the US Army, US Navy and US Air Force in the development of USMC specific requirements. Participate in Collaborative Event 1. Procure testing hardware for Quantico site to support developmental testing and Verification, Validation and Accreditation of USMC requirements.		
• (U) \$ 200	JSIMS: Continue technical expertise to test planning group for build 1 demonstration. Participate in Collaborative Event and provide Verification, Validation, and Accreditation of USMC requirements.		
• (U) \$ 528	JSIMS: Continue support in the development of USMC notional hardware configurations and participates in the Enterprise development of USMC C4I interface requirements.		
• (U) \$ 1,900	CVAT: Develop appended trainer M1A1 prototype.		
• (U) \$ 350	CVAT: Develop/Modify visual database.		
• (U) \$ 1,250	CVAT: Independent verification and validation/testing of prototype functionality and interfaces.		
(U)Total \$ 8,850			
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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE _____

February 1999

BUDGET ACTIVITY

PAGE NUMBER AND TITLE

7 - Operational System Development

0206313M Marine Corps Communications

Systems

B. (U) Project Change Summary

	FY 1998	FY 1999	FY 2000
1. Operating Expenses			
2. Operating Income			
3. Non-Operating Income			
4. Non-Operating Expenses			
5. Income Before Income Taxes			
6. Income Taxes			
7. Net Income			
8. Other Comprehensive Income			
9. Comprehensive Income			
10. Retained Earnings			
11. Dividends			
12. Other Equity Changes			
13. Equity			
14. Assets			
15. Liabilities			
16. Net Assets			

(U) Previous President's Budget

8,233	9,933	10,180
-------	-------	--------

(U) Adjustments to Previous President's Budget

-1,030 -565 -1,330

(U) Current Budget Submit

9,368 8,850

(U) Change Summary Explanation:

(U) Funding: FY 98 decrease of \$1,030K due to minor affordability adjustments for net reprogramming \$766K, SBIR \$261K and \$3K reprogrammed from JSIMS to CA. Decrease of \$365K in FY99 is due to below threshold reprogramming action. FY00 decrease is due to a delay in development and procurement of RIS and a scope reduction of affordable unique Marine Corps requirements in JSIMS.

(U) Schedule: N/A

(U) Technical: N/A

C. (U) Other Program Funding Summary
(APPN, BLI #, NOMEN)

FY 1998

FY 1999

FY 2000

FY 2001FY 2002FY 2003FY 2004FY 2005

To

Total

(APPN, BLI #, NOMEN)

(U) PMC, 653200, Training Devices/Simulators

6,501

3297

13848

32165

22339

18302

25466

25320

CONT

CONT

(U) Related RDT&E: PE 0603832D, Joint Simulation Management

R-1 Line Item 169

Budget Item Justification

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 1999
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
7 - Operational System Development	0206313M Marine Corps Communications Systems	C2315	

D. (U) Schedule Profile

JSIMS Schedule

JSIMS Major Milestones

Activity Name	CY	1996	1997	1998	1999	2000	2001	2002	2003
Contract Award									
Common Program Schedule									
Architecture Specification									
Build 0									
Build 1									
Build 2									
Version 1.0 (IOC)									
MS III									
Version 1.1									
Version 1.2									
Version 2.0 (FOC)									

R-1 Line Item 169

Budget Item Justification

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 1999
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
7 - Operational System Development	0206313M Marine Corps Communications Systems	C2315	

CVAT Schedule:

CVAT MAJOR MILESTONES

	1998				1999				2000				2001				2002				2003			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Acquisition Strategy																								
Finalize Procurement Package					◆																			
Proposal Evaluation								◆																
MS I Contract Award									◆															
Developmental Testing										◆														
Operational Capability Demo											◆													
Milestone II/III Decision												◆												
MS III Contract Award													◆											
First Article Test														◆										
First Article Delivery															◆									
IOC																◆								
FOC																								◆

R-1 Line Item 169

Budget Item Justification

(Exhibit R-2, Page 80 of 89)

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE	February 1999	PROJECT
BUDGET ACTIVITY										PE NUMBER AND TITLE		
7 - Operational System Development										0206313M Marine Corps Communications Systems		
A. (U) Project Cost Breakdown												
										FY 1998	FY 1999	FY 2000
Subtotal Product Development										6915	8901	8531
Subtotal Support and Management										288	169	119
Subtotal Test and Evaluation										0	298	200
Total										7203	9368	8850
B. Budget Acquisition History and Planning Information												
Performing Organizations												
Contractor or Government	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity	EAC	Project Office	EAC	Total Prior to FY 1998	FY 1998	FY 1999	FY 2000	Budget to Complete	Total Program
Product Development Organizations												
VISICOM, Labs												
Inc. San Diego, CA	RCP	NOV 97						3447	4373	2984	CONT	CONT
STRICOM Orlando, FL	RCP	NOV 98	1000	1000				0	1000	0	0	1000
TBD, MARCOR	RCP	DEC 99						0	0	3500	0	2700
SYSKOM												
NRaD, San Diego, CA	WR	DEC 97						1196	600	400	CONT	CONT
CECOM, Ft. Monmouth, NJ	MIPR	NOV 97						1375	528	528	CONT	CONT
Naval Air Warfare Center, Orlando, FL	RCP	DEC 97	680	680				279	401	0	0	1029
Naval Air Warfare Center Orlando FL	RCP	NOV 97	760	760				380	380	0	0	760
R-1 Line Item 169										Budget Item Justification		

(Exhibit R-3, Page 81 of 89)

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)					DATE	PROJECT
BUDGET ACTIVITY		PE NUMBER AND TITLE			C2315	
7 - Operational System Development		0206313M Marine Corps Communications Systems			February 1999	
		238			119	
MCI A	WR	NOV 97	CONT			CONT
Quantico, VA						
CCR	RCP	JAN 99	2500	0	1500	1000
Quantico, VA						0
						2500
Support and Management Organizations						
Naval Air Warfare Center, Orlando, FL	WR	NOV 97	100	50	50	0
						0
						100
Naval Surface Warfare Center Indian Head, MD	RCP	NOV 97		238	119	CONT
						CONT
Test and Evaluation Organizations						
MCOTEA	RCP	NOV 98		0	298	200
Quantico, VA						CONT
						CONT
Government Furnished Property						
Contract						
Method/Type or Funding Vehicle						
Award or Obligation Date						
Delivery Date						
Item Description				FY 1998	FY 1999	FY 2000
Product Development Property						
Support and Management Property						
Test and Evaluation Property						
Subtotal Product Development				FY 1998	FY 1999	FY 2000
Subtotal Support and Management				6915	8901	8531
Subtotal Test and Evaluation				288	169	119
Total Project				0	298	200
				7203	9368	8850

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE		February 1999	
BUDGET ACTIVITY			PE NUMBER AND TITLE							PROJECT			
7 - Operational System Development			0206313M Marine Corps Communications Systems							C2510			
COST (In Millions)			FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost	
C2510 MAGTF CSSE & SE			0	0	1141	1083	689	541	260	260	Continuing	Continuing	
Quantity of RDT&E Articles													
<p>A. (U) Mission Description and Budget Item Justification:</p> <p>(U) The MAGTF Combat Service Support Element & Supporting Establishment (CSSE & SE) consists of mutually supporting Logistics Information Technology (IT) programs that support force deployment, planning, and execution; sustainment and distribution; and contribute to the CINC's Common Operating Picture (COP) to support rapid accurate decision making.</p> <p>1. The ATLASS capability represents a deployable capability that will be used in the tactical deployed areas of the Marine Corps, as well as in garrison. The ATLASS PIP program funds the improvement of the fielded ATLASS II+ system as well as the migration of base and station (non-deployable) USMC intermediate and consumer level supply and maintenance systems from a mainframe environment into a personal computer application using a networked client server architecture. The ATLASS PIP consolidated the total force intermediate and consumer level supply and maintenance information management functions into a single material management system. ATLASS PIP enhances ATLASS II+, retires existing mainframe legacy applications in use by the bases and stations, and expands the client-server based supply maintenance and material readiness Automated Information System (AIS) ATLASS II+ to them. ATLASS PIP retains the flexibility to exploit existing commercial and government off-the-shelf software. This system remains compliant with the MAGTF C4I concept, GCCS COE, and published DOD standards for open systems architecture.</p> <p>2. TC-AIMS II is a Joint transportation and deployment Automated Information System (AIS) supporting the DOD mission areas of mobility and sustainment. It will replace two of our MAGTF LOG AIS applications over a parallel transition starting in FY00. TC-AIMS II will be used by Command Elements, Traffic Management Offices (TMO), and all operating forces deploying units to automate the processes of planning, organizing, coordinating, and controlling deployment, redeployment, and sustainment activities worldwide, in peace as well as during contingencies. It provides a modernized, scaleable, integrated, and easily deployable AIS that supports reengineered deployment and business processes throughout DOD. TC-AIMS II is the key enabler towards Force Deployment Planning and Execution. It is the source system for In-Transit-Visibility (ITV) data, which provides CINC's and Components with critical visibility of items in the transportation pipeline. TC-AIMS II links all DOD Component unit movement and Installation Transportation Office/Traffic Management Office (ITO/TMO) functionality into a single transportation management system. It is a Joint ACAT 1A(M) program, with the USMC portion being handled as an ACAT III.</p>													
R-1 Line Item 169										Budget Item Justification			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	PROJECT																
BUDGET ACTIVITY	PE NUMBER AND TITLE																		
7 - Operational System Development	0206313M Marine Corps Communications Systems	February 1999	C2510																
<p>(U) FY 1998 Accomplishments:</p> <ul style="list-style-type: none"> • (U) \$ 0 N/A (U)Total \$ 0 <p>(U) FY 1999 Planned Program:</p> <ul style="list-style-type: none"> • (U) \$ 0 N/A (U)Total \$ 0 <p>(U) FY 2000 Planned Program:</p> <ul style="list-style-type: none"> • (U) \$ 792 ATLAS PIP: Commence design and development activity of ATLAS PIPs • (U) \$ 205 ATLAS PIP: Evaluate and Integrate existing software and hardware modules and technology • (U) \$ 50 ATLAS PIP: Commence development of implementation and support plans • (U) \$ 50 TC-AIMS II: Exploration and development of Integration Plans with Air/Ship/Rail Load Planning and Joint Planning & Execution Tools, leveraging data warehousing and operational data stores initiatives. • (U) \$ 44 TC-AIMS II: Evaluate existing software modules, technology, and AIT enablers related to Sea Based Logistics and MPT-E requirements. <p>(U)Total \$ 1,141</p>																			
<p>B. (U) Project Change Summary</p> <table border="0"> <thead> <tr> <th></th> <th>FY 1998</th> <th>FY 1999</th> <th>FY 2000</th> </tr> </thead> <tbody> <tr> <td>(U) Previous President's Budget</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>(U) Adjustments to Previous President's Budget</td> <td>0</td> <td>0</td> <td>1141</td> </tr> <tr> <td>(U) Current Budget Submit</td> <td>0</td> <td>0</td> <td>1141</td> </tr> </tbody> </table> <p>(U) Change Summary Explanation:</p> <p>(U) Funding: FY00 adjustment is due to prioritization of programs within the Marine Corps.</p> <p>(U) Schedule: N/A</p> <p>(U) Technical: N/A</p>					FY 1998	FY 1999	FY 2000	(U) Previous President's Budget	0	0	0	(U) Adjustments to Previous President's Budget	0	0	1141	(U) Current Budget Submit	0	0	1141
	FY 1998	FY 1999	FY 2000																
(U) Previous President's Budget	0	0	0																
(U) Adjustments to Previous President's Budget	0	0	1141																
(U) Current Budget Submit	0	0	1141																
R-1 Line Item 169		Budget Item Justification																	

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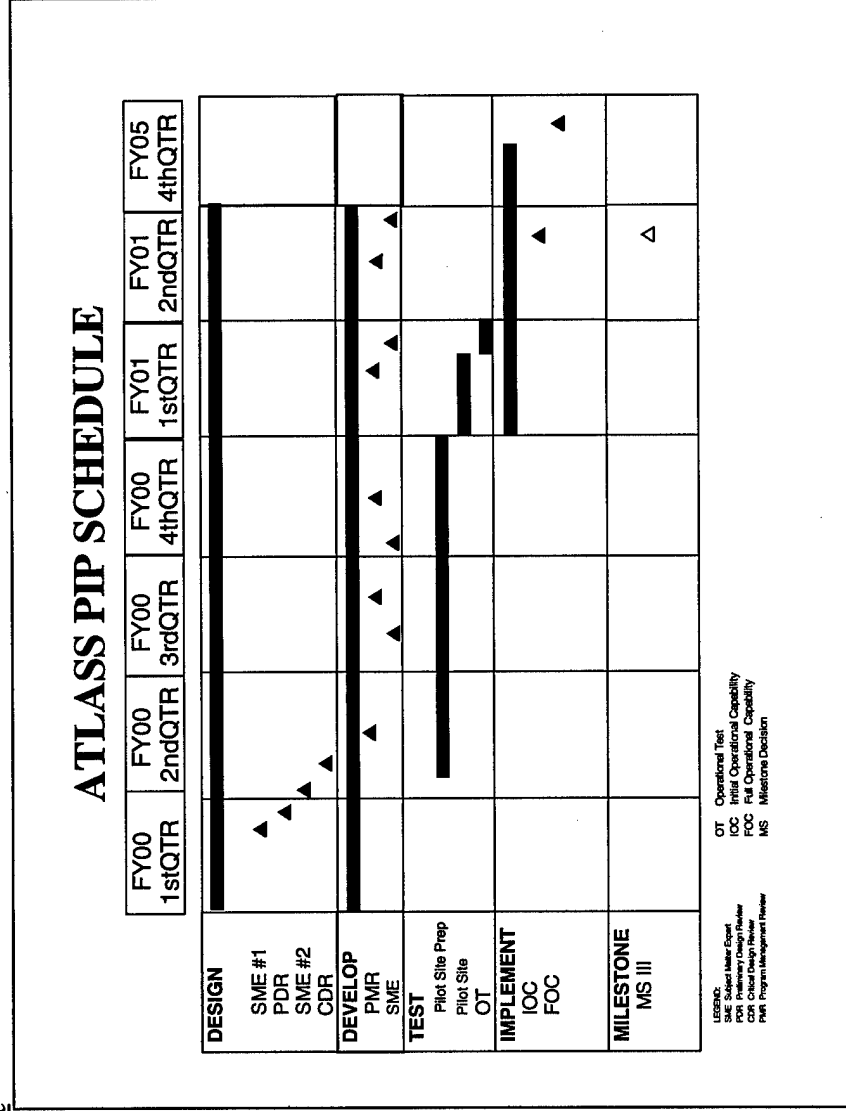
UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE	PROJECT	
BUDGET ACTIVITY			PE NUMBER AND TITLE									
7 - Operational System Development			0206313M Marine Corps Communications Systems							C2510		
			FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To	Total
C. (U) Other Program Funding Summary											Compl	Cost
(APPN, BLI #, NOMEN)												
(U) PMC Line (BLI#463500) ATCLASS II+			3745	10552	3489	7228	0	0	0	0	0	0
(U) PMC Line (BLI#464100) ATCLASS II+			0	0	0	0	2568	1181	390	485	0	0
(U) PMC Line (BLI#464100) TC-AIMS II			0	0	4518	4609	4066	0	0	0	0	0
(U) Related RDT&E												
None												

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 1999
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
7 - Operational System Development	0206313M Marine Corps Communications Systems	C2510	

D. (U) Schedule Profile
 Atlas PIP Schedule:



R-1 Line Item 169

Budget Item Justification

(Exhibit R-2, Page 86 of 89)

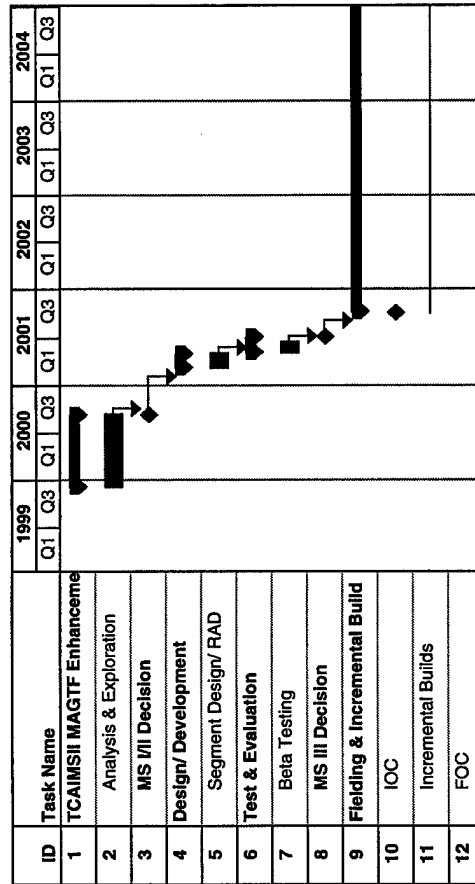
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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 1999
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
7 - Operational System Development	0206313M Marine Corps Communications Systems	C2510	

TC-AIMS II Schedule:

TC-AIMS II MAGTF R&D Enhancements



R-1 Line Item 169

Budget Item Justification

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE	PROJECT	
BUDGET ACTIVITY												
7 - Operational System Development												
PE NUMBER AND TITLE												
0206313M Marine Corps Communications Systems												
A. (U) Project Cost Breakdown												
Product Development										FY 1998	FY 1999	FY 2000
Support and Management										0	0	779
Test and Evaluation										0	0	101
Total										0	0	261
												1141
B. Budget Acquisition History and Planning Information												
Performing Organizations												
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1998	FY 1998	FY 1999	FY 2000	Budget to Complete	Total Program		
Product Development Organizations												
ATLASS PIP:												
SSC Chesapeake	MIPR	Jan 00	1665	1665	0	0	0	685	970	1665		
TC-AIMS II:												
US Army (PEOSTAMIS) (GTE, BBN)	FFP/O	Jan 00						94	CONT	CONT		
Support and Management Organizations												
ATLASS PIP:												
Logicon	Spt/Sves	Jan 00	151	151	0	0	0	101	50	151		
TC-AIMS II:												
US Army, PEOSTAMIS (GTE, BBN)	FFP/O	Jan 00	50	50	0	0	0	0	50	50		
Test and Evaluation Organizations												
ATLASS PIP:												
SSC Charleston	MIPR	Jan 00	383	383	0	0	0	261	122	383		
										R-1 Line Item 169		
										Budget Item Justification		

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

February 1999

BUDGET ACTIVITY

7 - Operational System Development

PE NUMBER AND TITLE

0206313M Marine Corps Communications Systems

PROJECT

C2510

TC-AIMS II:

MarCorSysCom,
Quantico, VA
(Logicon, MITRE)

FFP/O

Jan 00

**Total
Prior to
FY 1998**

FY 1998FY 1999FY 2000

Budget to Complete

Total Program

Subtotal Product Development
Subtotal Support and Management
Subtotal Test and Evaluation
Total Project

101

0

201

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Budget Item Justification

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February 1999
BUDGET ACTIVITY		PE NUMBER AND TITLE									
7 - Operational System Development		0206623M Marine Corps Ground Combat/Supporting Arms Systems									
	COST (In Millions)	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
Total Program Element (PE) Cost		12744	18185	39941	35487	20911	10647	9764	10030	Continuing	Continuing
C0021 Assault Amphibious Vehicle 7A1 (AAV7A1)		297	216	398	409	361	372	382	394	Continuing	Continuing
C1555 Light Armored Vehicle (LAV) PIP		1744	1548	11706	12556	6286	1342	1373	1411	Continuing	Continuing
C1901 Marine Corps Ground Weaponry PIP		6251	7462	24488	18695	9579	4507	3142	3290	Continuing	Continuing
C2086 Marine Enhancement Program		1684	3009	1484	1672	2639	2564	2906	2946	Continuing	Continuing
C2237 Amphibious Vehicle Test Branch		1524	1960	643	723	731	746	821	826	Continuing	Continuing
C2317 ASCIET		1154	0	0	0	0	0	0	0	0	0
C2503 Initial Issue		0	0	1222	1432	1315	1116	1140	1163	Continuing	Continuing
C2666 Automatic Target Tracker (ATT)		0	1995	0	0	0	0	0	0	0	1995
C2667 Shortstop Electronic Protection System (SEPS)		0	1995	0	0	0	0	0	0	0	1995
Quantity of RDT&E Articles											

(U) **Mission Description and Budget Item Justification:** This PE provides modification to Marine Corps Expeditionary Ground Force Weapon Systems to increase lethality, range survivability and operational effectiveness. It also provides for the development of AAV7A1 reliability, maintainability, operational and safety modifications, improvements in command and control in the ADMS, product improvements to the family of LAV's and the development effort for the LAV-AD variant. The AVTB provides facilities and personnel which perform a broad range of testing, repair and technical services to amphibious vehicles.

(U) **Justification for Budget Activity:** This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it encompasses engineering and manufacturing and manufacturing development for upgrade of existing operational systems.

R-1 Line Item 170

Budget Item Justification

(Exhibit R-2, Page 1 of 39)

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

February 1999

BUDGET ACTIVITY

7 - Operational System Development

PE NUMBER AND TITLE

020623M Marine Corps Ground
Combat/Supporting Arms Systems

PROJECT

C0021

COST (In Millions)	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
C0021 Assault Amphibious Vehicle 7A1 (AAV7A1)	297	216	398	409	361	372		394	Continuing	Continuing

Quantity of RDT&E Articles

A. (U) Mission Description and Budget Item Justification:

(U) The AAV7A1 RDT&E program provides for the development, test and preparation of Engineering Change Proposals (ECPs) to improve the performance, reliability, maintainability and safety of the AAV7A1 Family of Vehicles (FOV). This program also allows for the development of installation kits for the integration of communications and navigation equipment developed for integration into the AAV7A1 FOV.

(U) FY 1998 Accomplishments:

- (U) \$ 140 Engineering Support for various ECP developments to include integration of communications and navigation improvements to AAV7A1
- (U) \$ 157 Travel in support of RAM/RS
- (U)Total \$ 297

(U) FY 1999 Planned Program:

- (U) \$ 214 Continuing providing engineering support for integration of communications and navigation improvements to AAV7A1.
- (U) \$ 2 Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.
- (U)Total \$ 216

(U) FY 2000 Planned Program:

- (U) \$ 398 Complete providing engineering support for integration of communications and navigation improvements to AAV7A1
- (U)Total \$ 398

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Budget Item Justification

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	PROJECT																						
BUDGET ACTIVITY	PE NUMBER AND TITLE																								
7 - Operational System Development	0206623M Marine Corps Ground Combat/Supporting Arms Systems		C0021																						
<p>B. (U) <u>Project Change Summary</u></p> <p>(U) Previous President's Budget</p> <p>(U) Adjustments to Previous President's Budget</p> <p>(U) Current Budget Submit</p> <table border="1"> <thead> <tr> <th></th> <th>FY 1998</th> <th>FY 1999</th> <th>FY 2000</th> </tr> </thead> <tbody> <tr> <td></td> <td>331</td> <td>273</td> <td>396</td> </tr> <tr> <td></td> <td>-34</td> <td>-57</td> <td>+2</td> </tr> <tr> <td></td> <td>297</td> <td>216</td> <td>398</td> </tr> </tbody> </table> <p>(U) Change Summary Explanation:</p> <p>(U) Funding: Decrease of 34K in FY98 due to 9K SBIR tax and 25K transfer to MCOTEA to support AAV RAM/RS testing. Adjustments in FY99, and FY00 are due to revised economic and general adjustments.</p> <p>(U) Schedule: N/A</p> <p>(U) Technical: N/A</p>					FY 1998	FY 1999	FY 2000		331	273	396		-34	-57	+2		297	216	398						
	FY 1998	FY 1999	FY 2000																						
	331	273	396																						
	-34	-57	+2																						
	297	216	398																						
<p>C. (U) <u>Other Program Funding Summary</u></p> <p>(APPN, BLI #, NOMEN)</p> <p>(U) PMC, 202100, AAV PIP</p> <table border="1"> <thead> <tr> <th></th> <th>FY 1998</th> <th>FY 1999</th> <th>FY 2000</th> <th>FY 2001</th> <th>FY 2002</th> <th>FY 2003</th> <th>FY 2004</th> <th>FY 2005</th> <th>To Compl Cont.</th> <th>Total Cost Cont.</th> </tr> </thead> <tbody> <tr> <td></td> <td>13,684</td> <td>89,553</td> <td>80,714</td> <td>78,439</td> <td>68,487</td> <td>1,555</td> <td>1,499</td> <td>1,566</td> <td></td> <td></td> </tr> </tbody> </table>					FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl Cont.	Total Cost Cont.		13,684	89,553	80,714	78,439	68,487	1,555	1,499	1,566		
	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl Cont.	Total Cost Cont.															
	13,684	89,553	80,714	78,439	68,487	1,555	1,499	1,566																	
<p>(U) Related RDT&E: PE 0603611M (Marine Corps Assault Vehicles)</p>																									
<p>D. (U) <u>Schedule Profile:</u> N/A</p>																									
		R-1 Line Item 170	Budget Item Justification																						

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

February 1999

BUDGET ACTIVITY

7 - Operational System Development

PE NUMBER AND TITLE

0206623M Marine Corps Ground
Combat/Supporting Arms Systems

PROJECT

C1555

COST (In Millions)	FY 1998 Actual	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
C1555 Light Armored Vehicle (LAV) PIP	1744	1548	11706	12556	6286	1342	1373	1411	Continuing	Continuing	Continuing
Quantity of RDT&E Articles			17								

(U) Mission Description and Budget Item Justification: The Light Armored Vehicle Family of Vehicles (LAV FOV) consists of seven fielded LAV configurations, and one communications/intelligence-configured asset on an LAV chassis (Mobile Electronic Warfare Support System). Collectively, the LAV FOV provides a logistically self-contained, highly mobile, and lethal combined arms combat system to the Marine Air-Ground Task Force (MAGTF). These efforts will include, but not be limited to: a Service Life Extension Program (SLEP) which will ensure the LAV FOV will be capable of conducting its assigned missions by enhancing lethality and survivability, minimizing LAV operations and support costs, maximizing reliability, availability, maintainability, and durability; and ensuring high levels of fleet readiness; an Enhanced Fire Support Platform (EFSP) which will address current LAV FOV deficiencies by enhancing the capabilities of the existing LAV Mortar variant by investing in a new mortar system capable of extended range, greater lethality, and reduced call-for-fire response time; as well as improvements to the LAV Command and Control (C2) capabilities which will enhance overall Light Armored Reconnaissance (LAR) Battalion and MAGTF command and control capabilities by investing in C4I systems that will enhance communications, interoperability, and interconnectivity with the LAR Battalions and within other USMC C4I systems.

(U) FY 1998 Accomplishments:

- (U) \$ 513 Continued development, testing, and evaluation of urgent LAV reliability, availability, maintainability, durability (RAM-D), and readiness enhancements.
- (U) \$ 1231 Continued study and development of LAV Service Life Extension Program, including analysis of alternative modifications and upgrades.
- (U)Total \$ 1744

R-1 Line Item 170

Budget Item Justification

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

February 1999

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

7 - Operational System Development
0206623M Marine Corps Ground
Combat/Supporting Arms Systems

C1555

(U) FY 1999 Planned Program:

- (U) \$ 460 Complete development, testing and evaluation of urgent LAV RAM-D and readiness enhancements.
- (U) \$ 1076 Continued study, development, and analysis of existing and other technological solutions; commence developmental and operational test planning for the LAV Service Life Extension Program.
- (U) \$ 12 Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.
- (U) Total \$ 1548

(U) FY 2000 Planned Program:

- (U) \$ 4287 Development of 9 LAV SLEP operational system prototypes for developmental & operational test and evaluation of SLEP modifications.
- (U) \$ 2080 Continue study, analysis, and development of existing and other alternative technological solutions for the LAV Service Life Extension Program.
- (U) \$ 508 Continue and complete developmental and operational test planning for the LAV Service Life Extension Program Test Planning
- (U) \$ 1500 Conduct research and development of command and control technology and possible upgrades under the PIP concept.
- (U) \$ 2949 Conduct design and engineering addressing use of current 120 technology as it would apply to fire control enhancement under the PIP concept.
- (U) \$ 382 Incorporate elements of fire control enhancements into LAV PIP masterplan.
- (U) Total \$ 11706

B. (U) Project Change Summary

- (U) Previous President's Budget
- (U) Adjustments to Previous President's Budget
- (U) Current Budget Submit

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
	1768	1626	2687
	-24	-78	9019
	1744	1548	11706

(U) Change Summary Explanation:

- (U) Funding: FY 98 and FY 99 changes are due to revised economic and general adjustments. FY 2000 increase reflects upgrades such as the LAV Service Life Extension Program.
- (U) Schedule: Not Applicable.
- (U) Technical: Not Applicable.

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Budget Item Justification

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PE NUMBER AND TITLE

**0206623M Marine Corps Ground
Combat/Supporting Arms Systems**

C1555

Total

Compl

CONT

6541

Budget Item Justification

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE _____

February 1999

**PROJECT
C1555**

BUDGET ACTIVITY	PE NUMBER AND TITLE
7 - Operational System Development	0206623M Marine Corps Ground Combat/Supporting Arms Systems

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
A. (U) Project Cost Breakdown			
Product Development	1115	779	9749
Support Costs and Management	524	555	1167
Test and Evaluation	105	214	790
Total	1744	1548	11706

B. Budget Acquisition History and Planning Information

Performing Organizations										Total Program
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1998 FY 1998	FY 1999	FY 2000	Budget to Complete	Total Program	
Product Development Organizations										
Dies Div, GM	C/FF	Dec 97	915	915	312	300	0	0	915	
In-house Product	WR	1 st Qtr			0	448	1252	Continue	Continue	
Development										
Other	Various	Various			9380	31	7947	Continue	Continue	
Support and Management Organizations										
In-house Support	WR	1 st Qtr			22722	555	1167	Continue	Continue	
Test and Evaluation Organizations										
Other (LAV Test	WR	Various			4337	214	790	Continue	Continue	
Dir/YumaPrvGrd)										

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**0206623M Marine Corps Ground
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C1555

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7 - Operational System Development

0206623M Marine Corps Ground
Combat/Supporting Arms Systems

C1901

COST (In Millions)	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
C1901 Marine Corps Ground Weaponry PIP	6251	7462	24488	18695	9579	4507	3142	3290	Continuing	Continuing

Quantity of RDT&E Articles

A. (U) Mission Description and Budget Item Justification:

(U) This Project develops joint and Marine Corps unique improvements to infantry weapons and artillery technology, USMC unique Amphibious Armor Systems (AAS), improvements for the M1A1 Main Battle Tank and support systems, USMC Family of Small Craft, Night Vision Equipment and monitors national and international weapons developments.

(U) FY 1998 Accomplishments:

- (U) \$ 229 Armored Vehicle Driver's Viewer Enhancer (AVDVE): Continued integrated logistics documentation and testing for the Light Armored Vehicle (LAV) /Assault Amphibious Vehicle (AAV) procurement of the AVDVE for all Marine Corps vehicles.
- (U) \$ 160 M1A1 Armor Mods: Continued joint evaluation of modifications of amphibious armor including Component Enhancements, Advanced Fire Control Systems, survivability systems, M88 Tank Retriever and AVLB upgrades, combat identification and others.
- (U) \$ 1795 Target Location Designator Hand-off System (TLDHS): Continued participation in Joint-Service, U.S. Army-led EMD development of the Lightweight Laser Designator Rangefinder (LLDR) to include system design, subsystem fabrication and integration and user evaluations. Continued to define, design and develop TLDHS-specific software application and integration with the Marine Corps Data Automated Communication Terminal (DACT) and Rugged Hand-held Computer (RHC).
- (U) \$ 469 Fire Support Mods: Continued joint participation in artillery and fire support improvement projects. Specifically, continued joint sustainment of the M198 Howitzer, to include research, development and field user evaluations of the Hydraulic Assist Kit Package and Elimination of Radioactive Light Sources (ERLS) collimeter. Continued unilateral development of USMC-unique ballistics software for the Mortar Ballistic Computer (MBC) to include initial software definition and design. Initiated Marine Corps participation in Joint-Service, U.S. Army-led development of Firefinder Radar Position Analysis System software. Monitored U.S. Army development and executed USMC-unique cost analyses of the Gun Laying and Positioning System (GLPS) and Family of Artillery Munitions.
- (U) \$ 352 Mortar Ballistic Computer (MBC): Continued unilateral development of USMC-unique ballistics software for the Mortar Ballistic Computer.

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C1901

- (U) \$ 595 Infantry Mods: Continued joint participation and Marine Corps unique activities for evaluation of safety, lethality, and technology improvements for Marine Corps infantry/reconnaissance individual weapons, crew served weapons, and night vision devices. Pursue improvements in accuracy, reliability, and maintainability of the current service rifle, special operations weapons, and crew served weapons.
- (U) \$ 268 Thermal Weapons Sight (TWS)[AN/PAS-13]: Continued joint participation and Marine Corps unique activities for the testing and evaluation of TWS.
- (U) \$ 78 Family of Small Craft: Provided Fault Analysis and Fault Isolation (FAFI) for the Riverine Assault Craft (RAC) and the Rigid Raiding Craft (RRC) and associated equipment at Marine Corps Programs Department (MCPD), Fallbrook, CA.
- (U) \$ 2105 AN/VVR-1 Laser Warning Receiver: Developed an installation kit for the AN/VVR-1 laser warning receiver and an integrated target identification capability for the M1A1 tank.
- (U) \$ 200 Marine Corps Portion of Joint Ammunition Management Standard System.
- (U)Total \$ 6,251
- (U) FY 1999 Planned Program:
- (U) \$ 236 Armored Vehicle Driver's Viewer Enhancer (AVDVE): Complete integrated logistics documentation and testing for the LAV/AAV procurement of the Armored Vehicle Driver's Viewer Enhancer for all USMC vehicles.
- (U) \$ 253 M1A1 Armor Mods: Continue joint evaluation of modifications of amphibious armor including Component Enhancements, Advanced Fire Control Systems, survivability systems, M88 and AVLB upgrades, combat identification and others.
- (U) \$ 3531 Target Location Designator Hand-off System (TLDHS): Continue participation in the joint-Service, U.S. Army-led EMD development of the LLLDR hardware and software, and continue to develop TLDHS-specific software application. Continue integration of LLLDR with the DACT, C2PC, and the Marine Air-Ground Task Force (MAGTF) C4I architecture. Participate in the LLLDR IOT&E and demonstrate limited interoperability with artillery agencies (AFATDS) and close-air-support platforms (F-18 and AV-8B).
- (U) \$ 861 Fire Support Mods: Continue joint participation in artillery and fire support improvement projects. Specifically, continue joint sustainment of the M198 Howitzer, to include development of an improved Suspension Kit and user evaluations of the Elimination of Radioactive Light Sources (ERLS) collimeter. Continue joint software modeling, design and field user evaluations of the Firefinder Radar Position Analysis System. Conduct technical, operational and cost analysis of Family of Artillery Munitions. Provide support to the Marine Corps Warfighting Lab for the development, evaluation and rapid transition of fire support initiatives.
- (U) \$ 75 Mortar Ballistic Computer (MBC): Continue unilateral development of USMC-unique ballistics software for the Mortar Ballistic Computer.
- (U) \$ 600 Mortar Ballistic Computer (MBC): Forward Financed efforts within this project for FY00 to continue EMD phase.
- (U) \$ 1141 Infantry Wpns Mods: Continued joint participation and Marine Corps unique activities for evaluation of safety, lethality, and technology improvements for Marine Corps infantry/reconnaissance individual and crew served weapons. Pursue solutions to integrate weapons systems with existing and planned night vision and sighting technologies including revisions of mounts and interfaces. Begin weapon system integration into the Integrated Infantry Combat System (IICS) to enhance the efficiency, effectiveness and safety of the Combat System.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 1999
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7 - Operational System Development		C1901	
		PE NUMBER AND TITLE	
		0206623M Marine Corps Ground Combat/Supporting Arms Systems	
<hr/>			
• (U) \$ 613	Thermal Weapons Sight (TWS)[AN/PAS-13]: Joint participation and Marine Corps unique activities for the testing and evaluation of TWS.		
• (U) \$ 91	Family of Small Craft: Provide Fault Analysis and Fault Isolation (FAFI) for the Riverine Assault Craft (RAC) and the Rigid Raiding Craft (RRC) and associated equipment at MCPD, Fallbrook. Engineering support for the Raw Water Cooling System (RWCS) for the RAC.		
• (U) \$ 61	Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.		
(U)Total \$ 7,462			
<hr/>			
(U) FY 2000 Planned Program:			
• (U) \$ 261	M1A1 Armor Mods: Continue joint evaluation of modifications of amphibious armor including Component Enhancements, Advanced Fire Control Systems, survivability systems, M88 and AVLB upgrades, combat identification and others.		
• (U) \$ 1903	Target Location Designator Hand-off System (TLDHS): Complete Joint-service, U.S. Army-led EMD development and IOT&E of the LLDR. Complete initial systems integration between the LLDR and the DACT/Command & Control Personal Computer. Continue incremental refinement, coding, evaluation and Independent Verification & Validation (IV&V) of the TLDHS-specific software application to ensure interoperability with emerging Marine Corps tactical C4I architecture and with other fire support platforms and agencies. Conduct FOT&E of artillery (Variable Message Format/Package 11) fire support functionality.		
• (U) \$ 1053	Fire Support Mods: Continue joint participation in artillery and fire support improvement projects. Specifically, continue joint sustainment of the M198 Howitzer. Conduct preliminary technical, operational and cost analyses of alternative technologies to replace the AN/GVS-5 Laser Infrared Observation Set. Provide support to the Marine Corps Warfighting Lab for the development, evaluation and rapid transition of fire support initiatives.		
• (U) \$ 1271	Infantry Wpns Mods: Continued joint participation and Marine Corps unique activities for evaluation of safety, lethality, and technology improvements for Marine Corps infantry/reconnaissance individual and crew served weapons. Pursue solutions to integrate weapons systems with existing and planned night vision and sighting technologies including revisions of mounts and interfaces. Begin weapon system integration into the Integrated Infantry Combat System (IICS) to enhance the efficiency, effectiveness and safety of the Combat System.		
• (U) \$ 112	Thermal Weapons Sight (TWS)[AN/PAS-13]: Continued joint participation and Marine Corps unique activities for testing of the TWS.		
• (U) \$ 623	Family of Small Craft: Provide Fault Analysis and Fault Isolation (FAFI) for the Riverine Assault Craft (RAC) and the Rigid Raiding Craft (RRC) and associated equipment at MCPD, Fallbrook, CA. Engineering support for the Raw Water Cooling System (RWCS) for the RAC.		
• (U) \$ 450	Night Vision Mod Line: Continue joint participation and Marine Corps unique activities for evaluation of safety, lethality and technology improvements for Marine Corps Night Vision Devices. Provides for In Service Engineering Activity (ISEA) at NSWC, Crane, IN. Participate with ARMY PM-Night Vision at Ft Belvoir, VA on new enhancements for I2. Travel/TAD to support enhanced systems development and review of tests.		
• (U) \$ 265	Begin in-depth requirements analysis to establish the types and amounts of future ammunition required by the USMC. Establish active monitoring of US Army artillery ammunition development programs in order to leverage off and influence Army munitions R&D effort. Allow Marine Corps Operational Test and Evaluation Activity participation in all tests to collect/analyze data to support a procurement decision.		

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- (U) \$ 6000 AVLB Upgrade: Develop NDI integration design for mobility and hydraulic improvements to Armored Vehicle Launched Bridge. Begin fabrication of two upgraded Engineering Development Models (EDMs).
- (U) \$ 7200 Improved Recovery Vehicle: Initiate preliminary design of powertrain and weight improvements to M-88 Recovery Vehicle to include NDI alternatives.
- (U) \$ 5150 M1A1 Firepower Enhancements: Conduct trade studies to determine most cost effective upgrades to the tank fire control system. Initiate preliminary design of integrated NDI package to include improved thermal sight, automatic target tracker and north-finding/far target location capability. Begin fabrication/testing of prototype integrated system.
- (U) \$ 200 Family of Improved Lightweight Mortars: In conjunction with Program manager for Mortars, conduct concept exploration initiatives to determine the feasibility of alternative concepts for the Pointing Device (PD) for the Mortar Fire Control System (Light) (MFCS). The PD provides precise deflection, elevation, and Global Positioning System interface for the MFCS. Will down-select to no more than two alternatives for further development.

(U) Total \$ 24488

B. (U) Project Change Summary

- (U) Previous President's Budget
- (U) Adjustments to Previous President's Budget
- (U) Current Budget Submit

	FY 1998	FY 1999	FY 2000
	6313	7661	5228
	- 62	-199	+19260
	6251	7462	24488

(U) Change Summary Explanation:

- (U) Funding: Decreases in FY 1998 and FY 1999 are due to revised economic and general adjustments. Increase in FY 2000 is due to the addition of the Family of Small Craft Line, Night Vision Mod Line, Family of Artillery Munition, Armored Vehicle Launched Bridge, Improved Recovery Vehicle, M1A1 Firepower Enhancements, Family of Improved Mortars and revised economic and general adjustments.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

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	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl Cont.	Total Cost Cont.
C. (U) Other Program Funding Summary										
(APPN, BLI #, NOME)										
(U) PMC (BLI#206300) Modifications Kits (Tracked Vehicles)	4484	7708	22853	19301	16261	35032	65585	59391		
(U) PMC (BLI#210500) Items Less Than \$5 Million (Tracked Vehicles)	1943	97	0	0	0	0	0	0	0	2040
(U) PMC (BLI#220900) Modifications Kits (Arty & Other)	3712	2803	3288	3947	1489	8335	9986	7352		
(U) PMC (BLI#221000) Items Less Than \$5 Million (Other)	1653	105	0	0	0	0	0	0	0	1758
(U) PMC (BLI#468300) AN/TPQ-36 Firefinder Radar Upgrades	160	155	0	0	0	0	0	0	0	34355
(U) PMC (BLI#493000) Night Vision Equipment	6842	33586	9032	17761	24948	27888	40078	2267		
(U) PMC (BLI#473300) Fire Support Systems	0	0	0	12519	21678	20388	17319	0	0	71904
(U) PMC (BLI#643400) Amphibious Raid Equipment	0	3714	0	0	0	0	0	0	0	3714
(U) PMC (BLI#233400) Modular Weapon System	0	0	0	16146	0	0	0	0	0	16146
(U) PMC (BLI#222000) Weapons and Combat Vehicles	0	0	323	421	256	308	319	326		
(U) PMC (BLI#462000) Items Less Than \$5M (Communications and Electronics)	0	0	10303	8439	6932	10390	9500	5577		
(U) PMC (BLI#667000) Items Less Than \$5M	0	0	9102	5671	9003	8220	8431	6351		

(U) Related RDT&E

(U) All Ground Weapons and Ground Ammunition Systems: Army, Navy, Air Force, Coast Guard, and Special Operations Command.

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D. (U) Schedule Profile:

AVDVE

ID	Task Name	1998				1999				2000				2001				2002				2003			
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
1	MS-III																								
2	USMC IOT&E																								
3	PRODUCTION CONTRACT AWARD (CECOM)																								
4	USMC LIMITED PROCUREMENT MCPDM																								
5	OBLIGATE USMC FY-99 BUY (236)																								
6	USMC FOT&E																								
7	OT REPORT																								
8	USMC FULL PROCUREMENT MCPDM																								
9	PRODUCTION/FIELDING																								
10	IOC																								
11	FOC																								

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PROJECT

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MORTAR BALLISTIC COMPUTER (MBC)

Task Name	Finish	1999				2000				2001				2002				2003				2004				2005			
		Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4			
MNS	Tue 10/5/93																												
MS 0	Mon 5/23/94																												
RAA Study	Fri 5/14/99																												
ORD CH 1	Tue 6/15/99																												
MS I/III	Mon 7/12/99																												
Contract Award	Wed 9/1/99																												
S/W Conversion	Fri 6/30/00																												
DT	Fri 10/13/00																												
H/W Porting	Thu 3/1/01																												
OT	Tue 5/1/01																												
S/W - H/W INTEGRATION	Fri 8/30/02																												
PRODUCTION	Fri 10/31/03																												
IOC	Wed 1/1/03																												
FOC	Mon 11/3/03																												

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T H E R M A L W E A P O N S S I G H T

	96 3 4	1997				1998				1999				2000				2001				2002				2003			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Army LRIP																													
USMC MS 0																													
Change 1 to O&O																													
ARMY OT																													
Develop/Staff LAP																													
Publish LAP																													
Develop LRFS																													
Revise LRFS																													
Update HARDMAN																													
Army MS III (LRIP/Bridge)																													
OMNIBUS Contract																													
Develop/Staff ULSS																													
OT III (USMC OT)																													
USMC MS I/III																													
Contract Award																													

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TLDHS

ID	Task Name	1996	1997	1998	1999	2000	2001	2002	2003	2004	20
1	Milestone I/II	2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2
2	EMD Contract Award		▲	▲							
3	Engineering & Manufacturing Development		▲	▲	▲	▲	▲	▲	▲	▲	
4	System Development LLDR		▲	▲	▲	▲	▲	▲	▲	▲	
5	System Development TLDHS		▲	▲	▲	▲	▲	▲	▲	▲	
6	CDR			▲							
7	Test Article Delivery			▲	▲	▲	▲	▲	▲	▲	
8	LMMD			▲	▲	▲	▲	▲	▲	▲	
9	Test Phase			▲	▲	▲	▲	▲	▲	▲	
10	DT Testing (Joint, followed by TLDHS unique)			▲	▲	▲	▲	▲	▲	▲	
11	LLDR Joint Service IOT&E			▲	▲	▲	▲	▲	▲	▲	
12	TLDHS Unique OT			▲	▲	▲	▲	▲	▲	▲	
13	FOT&E Artillery (VMF)				▲	▲	▲	▲	▲	▲	
14	FOT&E CAS (JVMF)					▲	▲	▲	▲	▲	
15	FOT&E Naval Gunfire						▲	▲	▲	▲	
16	Milestone III (Base System)					▲	▲	▲	▲	▲	
17	USMC Production Decision					▲	▲	▲	▲	▲	

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AVLB

Task Name	2000				2001				2002				2003				2004				2005			
	Q2	Q3	Q4		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
MS/II	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
ENGINEERING AND MANUFACTURING DEVELOPMENT																								
EMD RFP																								
EMD CONTRACT AWARD																								
DESIGN NDI INTEGRATION PACKAGE																								
FABRICATE 2 EDMs																								
DT/OT																								
OT REPORT																								
MS III																								
PRODUCTION/FIELDING																								
PRODUCTION RFP																								
PROD CONTRACT AWARD																								
PRODUCTION																								
FIELDING																								
IOC																								
FOC																								

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7 - Operational System Development

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MIA1 FIREPOWER ENHANCEMENT

ID		Task Name	2000				2001				2002				2003				2004			
			Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
1	1	MSI/II	◆ 6/1																			
2	2	ENGINEERING AND MANUFACTURING DEVELOPMENT	◆																			
3	3	EMD RFP	◆ 6/8																			
4	4	EMD CONTRACT AWARD	◆ 11/1																			
5	5	PRELIMINARY DESIGN																				
6	6	FABRICATE PROTOTYPES																				
7	7	PROTOTYPE TESTING																				
8	8	FINAL DESIGN																				
9	9	FABRICATE EDMs																				
10	10	DT/OT																				
11	11	OT REPORT																				
12	12	MS III																				
13	13	PRODUCTION/FIELDING																				
14	14	PRODUCTION RFP																				
15	15	PROD CONTRACT AWARD																				
16	16	PRODUCTION																				
17	17	FIELDING																				
18	18	IOC																				
19	19	FOC																				

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PROJECT

C1901

IMPROVED RECOVERY VEHICLE (IRV)

ID	Task Name	2000				2001				2002				2003				2004				2005			
		Q2	Q3	Q4		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1	MSI/II	◆ 6/1																							
2	ENGINEERING AND MANUFACTURING DEVELOPMENT																								
3	EMD RFP	◆ 6/8																							
4	EMD CONTRACT AWARD																								
5	PRELIMINARY DESIGN																								
6	FABRICATE PROTOTYPE																								
7	PROTOTYPE TESTING																								
8	FINAL DESIGN																								
9	FABRICATE 2 EDMs																								
#	DT/OT																								
#	OT REPORT																								
#	MS III																								
#	PRODUCTION/FIELDING																								
#	PRODUCTION RFP																								
#	PROD CONTRACT AWARD																								
#	PRODUCTION																								
#	FIELDING																								
#	IOC																								
#	FOC																								

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

February 1999

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

7 - Operational System Development

0206623M Marine Corps Ground
Combat/Supporting Arms Systems

C1901

A. (U) Project Cost Breakdown
Systems Engineering & Development
Program Management and Support
Test and Evaluation
Total

FY 1998	FY 1999	FY 2000
5288	5890	23030
550	580	830
413	992	628
6251	7462	24488

B. Budget Acquisition History and Planning Information

Performing Organizations

Contractor or Government Performing Activity	Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1998	FY 1998	FY 1999	FY 2000	Budget to Complete	Total Program
Product Development Organizations										
Acquisition	WR/RCP	1 st Qtr			3763		225	240	310	CONT.
Logistics Support, Dumfries, VA										
NSWC, Crane, IN	WR/RCP	1 st Qtr			1144		255	270	190	CONT.
AMCOM, Huntsville, AL	MIPR	1 st Qtr			3441		410	425	340	CONT.
NSWC, Dahlgren, VA	WR/RCP	1 st Qtr			3300		275	300	300	CONT.
MCPD, Fall Brook, CA	WR/RCP	1 st Qtr			228		375	380	580	CONT.
NSWC, Indian Head, MD	WR/RCP	1 st Qtr			0		425	475	410	CONT.
BENET LABS, Albany NY	MIPR	1 st Qtr			37		148	170	120	CONT.
PM NVRSTA, Ft Belvoir, VA	MIPR	1 st Qtr			0		1190	1100	490	CONT.

R-1 Line Item 170

Budget Item Justification

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)				DATE	PROJECT			
BUDGET ACTIVITY		PE NUMBER AND TITLE			C1901			
7 - Operational System Development		0206623M Marine Corps Ground Combat/Supporting Arms Systems						
Support and Management Organizations Acquisition	WR/RCP	Various	19486	550	580	640	CONT.	CONT.
Logistics Support, Dumfries, VA	WR	1 st Qtr	0	0	0	30	CONT.	CONT.
MCCDC Acquisition	RCP	Various	0	0	0	25	25	50
Logistics Support, Dumfries, VA								
(AVLB) Acquisition	RCP	Various	150	0	0	50	100	150
Logistics Support, Dumfries, VA								
(IRV) Acquisition	RCP	Various	300	0	0	75	225	300
Logistics Support, Dumfries, VA								
(M1A1 Firepower) ALS (Mortars)	RCP	TBD	20	0	0	10	10	20
Total Support and Management			19486	550	580	830	CONT.	CONT.
Test and Evaluation Organizations								
AMCOM, Huntsville, AL	MIPR	1 st Qtr	5160	150	0	0	CONT.	CONT.
CECOM, New Jersey	MIPR	1 st Qtr	0	150	0	0	CONT.	CONT.
MCCDC, Quantico, VA	WR/RCP	1 st Qtr	5540	20	700	280	CONT.	CONT.
R-1 Line Item 170				Budget Item Justification				

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)				DATE	PROJECT
BUDGET ACTIVITY	PE NUMBER AND TITLE				
7 - Operational System Development	0206623M Marine Corps Ground Combat/Supporting Arms Systems				C1901
MCPD, Fallbrook, CA	WR/RCP	1 st Qtr	341	0	18
NSWC, Dahlgren, VA	WR/RCP	1 st Qtr	4950	35	155
NSWC, Crane, IN	WR/RCP	1 st Qtr	1717	50	75
PM NVRSTA, Ft Belvoir, VA	MIPR	1 st Qtr	0	0	50
MCOTEA, Quantico, VA			0	0	50
MCOTEA, Quantico, VA (AVLB)	WR		1075	1075	1075
Misc	Various	Various	4598	8	17
Total Test & Eval			22306	413	992
Government Furnished Property N/A					
Contract					
Item Description	Method/Type or Funding Vehicle	Award or Obligation Date	Delivery Date	Total Prior to FY 1998	Budget to Complete FY 1999
Product Development Property					
Support and Management Property					
Test and Evaluation Property					
R-1 Line Item 170				Budget Item Justification	

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)			DATE	PROJECT
BUDGET ACTIVITY	PE NUMBER AND TITLE			
7 - Operational System Development	0206623M Marine Corps Ground Combat/Supporting Arms Systems			
		Total	Budget to	Total
		Prior to	Complete	Program
		FY 1998	FY 1999	FY 2000
		18471	5288	23030
		19486	5890	830
		22306	580	628
		60263	992	24488
			7462	
Subtotal Product Development				Con't
Subtotal Support and Management				Con't
Subtotal Test and Evaluation				Con't
Total Project				Con't
		R-1 Line Item 170	Budget Item Justification	

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DATE

February 1999

BUDGET ACTIVITY

7 - Operational System Development

PE NUMBER AND TITLE

0206623M Marine Corps Ground
Combat/Supporting Arms Systems

PROJECT

C2086

COST (In Millions)	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
C2086 Marine Enhancement Program	1684	3009	1484	1672	2639	2564	2906	2946	Continuing	Continuing

Quantity of RDT&E Articles

A. (U) Mission Description and Budget Item Justification:

(U) This program was formerly titled Soldier/Marine Enhancement. MEP provides Research, Development, Test and Evaluation funding for low visibility, low cost items. It focuses on items of equipment which will benefit the individual Marine by reducing the load, increasing survivability, enhancing safety and improving combat effectiveness. The emphasis of the program is on non-developmental/commercially available items which can be quickly evaluated and fielded. This program is coordinated with the Army's Soldier Enhancement Program and the Special Operations Command.

(U) FY 1998 Accomplishments:

- (U) \$ 472 Continued to explore Non-Developmental Item (NDI) equipment that will improve the combat effectiveness and enhance safety and survivability of the Individual Marine.
- (U) \$ 450 Continued to explore clothing and individual equipment NDI categories.
- (U) \$ 355 Continued to explore ground weapons, communications and command and control equipment NDI categories.
- (U) \$ 427 Explored initial issue clothing and individual equipment categories.
- (U)Total \$ 1,684

(U) FY 1999 Planned Program:

- (U) \$ 510 Continue to explore NDI equipment that will improve the combat effectiveness and enhance safety and survivability of the Individual Marine.
- (U) \$ 518 Continue to explore clothing and individual equipment NDI categories.
- (U) \$ 509 Continue to explore ground weapons, communications and command and control equipment NDI categories.
- (U) \$ 1437 Explore initial issue clothing and individual equipment categories.
- (U) \$ 35 Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.
- (U)Total \$ 3,009

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Budget Item Justification

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February 1999

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

7 - Operational System Development

0206623M Marine Corps Ground
Combat/Supporting Arms Systems

C2086

(U) FY 2000 Planned Program:

- (U) \$ 505 Continue to explore NDI equipment that will improve the combat effectiveness and enhance safety and survivability of the Individual Marine.
- (U) \$ 468 Continue to explore clothing and individual equipment NDI categories.
- (U) \$ 511 Continue to explore ground weapons, communications and command and control equipment NDI categories.
- (U) Total \$ 1,484

B. (U) Project Change Summary

	FY 1998	FY 1999	FY 2000
(U) Previous President's Budget	1766	2399	3174
(U) Adjustments to Previous President's Budget	-82	+610	-1690
(U) Current Budget Submit	1684	3009	1484

(U) Change Summary Explanation:

(U) Funding: FY 1998 decrease of \$82K is due to revised economic and general adjustments. FY 1999 increase of \$610 is due to an internal realignment within this PE. Decrease in FY 00 is due to the split of Initial Issue funding to its own project and revised economic and general adjustments.

(U) Schedule: N/A

(U) Technical: N/A

C. (U) Other Program Funding Summary

(APPN, BLI #, NOMEIN)

	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl Cont.	Total Cost Cont.
(U) PMC (BLI #221100) MEP	869	2070	2956	6505	2251	4231	4131	4200		
(U) O&M Initial Issue	24959	25659	26376	27114	27872	28655				

(U) Related RDT&E: PE 0604713A (Combat Feeding, Clothing and Equipment)

D. (U) Schedule Profile: N/A

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Budget Item Justification

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)				DATE	February 1999	PROJECT
BUDGET ACTIVITY		PE NUMBER AND TITLE				C2086
7 - Operational System Development		0206623M Marine Corps Ground Combat/Supporting Arms Systems				
		238	9	25	7	
ARL/APG	MIPR	1 st Qtr				Con't
Aberdeen, MD						
PM, Mortar, Ft.	MIPR	1 st Qtr	544	0	0	Con't
Monmouth, NJ						
PPSC,	MIPR	3 rd Qtr	13	0	0	Con't
Philadelphia, PA						
MCAGCC,	WR/RCP	1 st Qtr	104	0	0	Con't
Twenty-Nine						
Palms, CA						
NSMA	MIPR	1 st Qtr	157	18	10	Con't
Washington, DC						
TACOM, Warren,	MIPR	1 st Qtr	55	12	118	Con't
MI						
NHRC, Crane, IN	MIPR	2 nd Qtr	365	24	33	Con't
2 nd MARDIV	WR	1 st Qtr	64	2	5	Con't
CamLej, NC						
NCCOSC, San	WR	1 st Qtr	193	24	39	Con't
Diego, CA						
NCSS, Panama	WR	1 st Qtr	1866	14	10	Con't
City, FL						
NSWC, Crane, IN	WR	1 st Qtr	1919	81	273	Con't
NAWC Air Div	WR	1 st Qtr	199	57	56	Con't
Patuxent River,						
MD						
II MEF, CamLej,	WR	1 st Qtr	75	5	0	Con't
NC						
NFESC, San	MIPR	2 nd Qtr	344	0	0	Con't
Diego, CA						
NSWC IHD,	WR	4 th Qtr	164	0	0	Con't
Indian Head, MD						
Support and Management Organizations						
		R-1 Line Item 170	Budget Item Justification			

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)				DATE	February 1999	PROJECT
BUDGET ACTIVITY	PE NUMBER AND TITLE			C2086		
7 - Operational System Development	0206623M Marine Corps Ground Combat/Supporting Arms Systems					
MCCDC, Quantico, VA	WR	1991	48	192	37	Con't
MISC	Various	4379	55	60	41	Con't
Test and Evaluation Organizations	WR/RCP	1774	44	47	24	Comb't
MCTSSA, CamPen, CA	WR/RCP	846	5	3	5	Con't
NCTRF, Aberdeen, MD	MIPR	2243	227	550	127	Con't
NATICK, Natick, MA	MIPR	787	14	19	12	Con't
ARL/APG, Aberdeen, MD	MIPR	1803	0	0	0	Con't
PM, Mortors, Ft. Monmouth, NJ	MIPR	42	4	0	4	Con't
PPSC, Philadelphia, PA	WR/RCP	340	11	18	8	Con't
MCAGCC	MIPR	507	32	43	21	Con't
Twenty-Nine Palms, CA	MIPR	178	21	25	21	Con't
NSMA, Washington, DC	MIPR	1257	216	380	152	Con't
TEXCOM, Warran, MI	WR	212	12	10	12	Con't
NHRC, Crane, IN	WR	638	36	31	36	Con't
2nd MarDiv, CamLej, NC	WR	6177	15	15	15	Con't
NCCOSC, San Diego, CA						
NCSS, Panama City, FL						
R-1 Line Item 170				Budget Item Justification		

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)									
BUDGET ACTIVITY				DATE		PROJECT			
7 - Operational System Development				February 1999		C2086			
PE NUMBER AND TITLE									
0206623M Marine Corps Ground Combat/Supporting Arms Systems									
NSWC, Crane, IN	WR	1 st Qtr		6299	261	410	261	Con't	Con't
NAWC Air Div, Patuxent River, MD	WR	1 st Qtr		625	163	154	163	Con't	Con't
II MEF CamLej, NC	WR	1 st Qtr		5506	0	0	0	Con't	Con't
NFESC, San Diego CA	MIPR	2 nd Qtr		1139	0	0	0	Con't	Con't
NSWC IHD, Indian Head, MD	WR	4 th Qtr		546	10	10	10	Con't	Con't
MISC	Various	Various		8780	71	90	196	Con't	Con't
Government Furnished Property Contract									
Item Description	Method/Type or Funding Vehicle	Award or Obligation Date	Delivery Date	Total Prior to FY 1998	FY 1998	FY 1999	FY 2000	Budget to Complete	Total Program
Product Development Property									
Not Applicable									
Support and Management Property									
Test and Evaluation Property									
Subtotal Product Development				Total Prior to FY 1998	FY 1998	FY 1999	FY 2000	Budget to Complete	Total Program
Subtotal Support and Management				10838	439	952	339	Con't	Con't
Subtotal Test and Evaluation				6370	103	252	78	Con't	Con't
Total Project				39699	1142	1805	1067	Con't	Con't
				56907	1684	3009	1484	Con't	Con't
R-1 Line Item 170									
Budget Item Justification									

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DATE

February 1999

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

7 - Operational System Development

0206623M Marine Corps Ground
Combat/Supporting Arms Systems

C2237

COST (In Millions)	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
C2237 Amphibious Vehicle Test Branch	1524	1960	643	723	731	746	821	826	Continuing	Continuing

Quantity of RDT&E Articles

A. (U) Mission Description and Budget Item Justification:

(U) The Amphibious Vehicle Test Branch (AVTB) is a one-of-a-kind Department of Defense test facility for amphibious vehicles and supports the requirements of all Services. The AVTB conducts developmental, combined developmental/operational, and follow-on testing and evaluation of production hardware. It also conducts Product Assurance Testing and Substitute or alternative parts and material testing for amphibious vehicles and associated equipment. Because of its year-round temperate climate, diverse terrain, and 17 miles of coastline, the AVTB is ideal for amphibious vehicle, as well as ship related testing. The AVTB is in close proximity to San Clemente island which is used frequently for live fire sea-to-shore testing and high-speed water testing. The AVTB is committed to testing product improvement programs, engineering change proposal design changes, and field change requests.

(U) FY 1998 Accomplishments:

- (U) \$ 174 Program support, supplies, and services at AVTB test site to support scheduled Assault Amphibious Vehicle 7A1 (AAV7A1) "rebuild to standard" testing, Advanced Amphibious Assault Vehicle (AAAV) Developmental Testing as well as other Marine Corps mobility and mine warfare programs. Program on-site support, supplies, and services to support Naval Sea Systems Command and Naval Mine Warfare Command for development testing of Navy mine countermeasures system. Provided services and support to the Department of Defense Common Test and Training Range Architecture workshops. These funds provided organic supply support including management operations, general accounting, and a maintenance float of equipment. Provided intermediate maintenance (third echelon) of organic non-developmental communication electronic and ordnance equipment.
- (U) \$ 99 Provided funding for necessary services provided by Marine Corps Base, Camp Pendleton (MCB CAMPEN), California and off-station units for electricity, heating and other power charges; long distance telephone support; and calibration of laboratory test equipment and maintenance.

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Budget Item Justification

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PE NUMBER AND TITLE

PROJECT

7 - Operational System Development

0206623M Marine Corps Ground
Combat/Supporting Arms Systems

C2237

- (U) \$ 1251 Provided AVTB personnel civilian salaries to support scheduled AAV7A1 and AAV Developmental Testing. Planned and conducted Developmental Tests and report results, identifying any unresolved test issues in accordance with approved test plans and procedures. Supported Marine Corps Operational Test and Evaluation Activity (MCOTEA) in AAV, Reliability, Availability, Maintainability/Rebuild to Standards (RAM/RS), Initial Operational Test & Evaluation (IOT&E). Prepared analysis of field-reported problems as received. Provided recommendations pertaining to design requirements which affect both operational effectiveness and operation suitability. Performed all echelons of maintenance on developmental items, including all on-hand assets of assault amphibious vehicles, within the capabilities of on-hand personnel, tools, test, and measuring equipment and facilities. Provided technical assistance and recommendations in the test of substitute or alternate parts and materials. Prepared technical analysis of proposed product improvements as requested. Prepared analysis of proposed engineering changes. Conducted hardware testing and evaluation of design changes, including verification of both the design and the technical data in accordance with approved test plans and procedures. Provided technical assistance in writing and revision of Technical Manuals. Provided technical reviews and recommendations regarding proposed Modification, Technical, Retrofit Instructions, and Retrofit Kit Hardware. Provided Testing expertise to Program Managers to assist in program acquisition strategy development. Provided Technical reviews and recommendation on Test and Evaluation Master Plans (TEMP's) and Detailed Test Plans for Program Managers. Provided technical input as the Marine Corps Developmental Testing representative to the Department of Defense Common Test and Training Range Architecture workshops. Conducted study to improve business processes to increase efficiencies and service.

(U)Total \$ 1,524

(U) FY 1999 Planned Programs:

- (U) \$ 483 Maintenance, refurbishment, upgrade, and replacement of test equipment and instrumentation needed to provide program support, supplies, and services at AVTB test site to support scheduled Assault Amphibious Vehicle 7A1 (AAV7A1) "rebuild to standard": testing, Advanced Amphibious Assault Vehicle (AAAV) Development Testing as well as other Marine Corps mobility and mine warfare programs. Program on-site support, supplies, and services to support Naval Sea System Command and naval Mine Warfare Command for development testing of Navy mine countermeasures system. Provide services and support to the Department of Defense Common test and Training Range Architecture workshops. These funds provide organic supply support including management operations, general accounting, and a maintenance float of equipment. Provide intermediate maintenance (third echelon) of organic non-developmental communication electronic and ordnance equipment.
- (U) \$ 151 Provide funding for necessary services provided by Marine Corps Base, Camp Pendleton (MCB CAMPEN), California for electricity, heating, and other power charges; and long distance telephone support. Provided funding for calibration of laboratory test equipment and maintenance services provided by Marine Corps Logistics Base (MCLB) Barstow and 1 Force Service Support Group (FSSSG).

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PE NUMBER AND TITLE

PROJECT

7 - Operational System Development

0206623M Marine Corps Ground
Combat/Supporting Arms Systems

C2237

- (U) \$ 1319 Provide AVTB personnel civilian salaries to support scheduled AAV7A1 and AAAV Developmental Testing. Plan and conduct Developmental Tests and report results, identifying any unresolved test issues in accordance with approved test plans and procedures. Prepare analysis of field-reported problems as received. Provide recommendations pertaining to design requirements which affect both operational effectiveness and operation suitability. Perform all echelons of maintenance on developmental items, including all on-hand assets of assault amphibious vehicles, within the capabilities of on-hand personnel, tools, test, and measuring equipment and facilities. Provided technical assistance and recommendations in the test of substitute or alternate parts and materials. Prepare technical analysis of proposed product improvements as required. Prepared analysis of proposed engineering changes. Conduct hardware testing and evaluation of design changes, including verification of both the design and the technical data in accordance with approved test plans and procedures. Provide technical assistance in writing and revision of Technical Manuals. Provide technical reviews and recommendations regarding proposed Modification, Technical, Retrofit Instructions, and Retrofit Kit Hardware. Provide Testing expertise to Program Managers to assist in program acquisition strategy development. Provide Technical reviews and recommendation on Test and Evaluation Master Plans (TEMP'S) and Detailed Test Plans for Program Managers. Provide technical input as the Marine Corps Developmental Testing representative to the Department of Defense Common Test and Training Range Architecture workshops.
- (U) \$ 7 Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.
- (U)Total \$ 1,960

(U) FY 2000 Planned Program:

- (U) \$ 490 Maintenance, refurbishment, upgrade, and replacement of test equipment and instrumentation needed to provide program support, supplies, and services at AVTB test site to support scheduled Assault Amphibious Vehicle 7A1 (AAV7A1) "rebuild to standard" testing, Advanced Assault Amphibious Vehicle (AAAV) Development Testing as well as other Marine Corps mobility and mine warfare programs. Program on-site support, supplies, and services to support Naval Sea System Command and Naval Mine Warfare Command for development testing of Navy mine countermeasures system. Provide services and support to the Department of Defense Common Test and Training Range Architecture workshops. These funds provide organic supply support including management operations, general accounting, and a maintenance float of equipment. Provide intermediate maintenance (third echelon) of organic non-development communication electronic and ordnance equipment.
- (U) \$ 153 Provide funding for necessary services provided by Marine Corps Base, Camp Pendleton (MCB CAMPEN), California for electricity, heating, and other power charges; and long distance telephone support. Provide funding for calibration of laboratory test equipment and maintenance services provided by MCLB Barstow and 1FSSG.
- (U)Total \$ 643

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BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

7 - Operational System Development

0206623M Marine Corps Ground
Combat/Supporting Arms Systems

C2237

B. (U) Project Change Summary

- (U) Previous President's Budget
- (U) Adjustments to Previous President's Budget
- (U) Current Budget Submit

FY 1998	FY 1999	FY 2000
1596	1965	2015
-72	-5	-1372
1524	1960	643

(U) Change Summary Explanation:

(U) Funding: FY 1998 decrease of \$72K reflects minor program changes. FY 1999 decrease is due to revised economic and general adjustments. Decrease in FY00 is due to transfer of AVTB civilian salaries to the O&M, MC appropriation and revised economic and general adjustments.

(U) Schedule: N/A

(U) Technical: N/A

C. (U) Other Program Funding Summary

(APPN, BLI #, NOMEN)

(U) Not Applicable

FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To	Total
								Compl	Cost

(U) Related RDT&E: PE 0603611M (Marine Corps Assault Vehicles)

D. (U) Schedule Profile

Testing conducted at AVTB includes all aspects of Marine Corps Assault Amphibious Vehicles. Testing planned for FY 98 and beyond includes MK 155 Minefield Breaching System, NBC overpressure system, RAM/RS (Reliability, Availability and Maintainability/Rebuild to Standard) Proof of Principle Developmental Testing, Operational Testing Support and Production Assurance testing; Engineering Change Proposals (ECP) as required; combined Recoil Booster (CRB) for adoption of Multiple Integrated Laser Engagement System (MILES) for AAV use; support for Extended Littoral Battlefield Advanced Concept Technology Demonstration; C4I integration support for AAV Communications 7 RAM/RS. AVTB will also support the testing of the Advanced Amphibious Assault Vehicle (AAAV) as directed, by DRPM AAAV, during the Program Definition & Risk Reduction phase of the AAAV Program Development.

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BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT	
7 - Operational System Development		0206623M Marine Corps Ground Combat/Supporting Arms Systems								C2503	
	COST (In Millions)	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
C2503	Initial Issue	0	0	1222	1432	1315	1116	1140	1163	Continuing	Continuing
Quantity of RDT&E Articles											
<p>A. (U) Mission Description and Budget Item Justification: This program was formerly reported under C2086, Marine Enhancement Program. The Initial Issue program provides Research, Development, Test and Evaluation of low visibility, low cost items with emphasis on non-developmental/commercial available items. Items approved for procurement will transition into the O&M Initial Issue program. Focus is on clothing and equipment items (i.e. improved Jungle and Desert Boots, Light Weight Helmet, combat boots, sleeping bags) which will benefit the individual Marine by reducing the load with less bulky, lightweight, comfortable equipment, increasing survivability and improving combat effectiveness. Initial Issue continues to explore the spectrum of technologies commercially available that can provide enhancement in individual protection, tactical mobility and application of state-of-the-art technologies through studies and testing.</p> <p>(U) FY 1998 Accomplishments: This program is contained in Project C2086 in this PE.</p> <p>(U) FY 1999 Planned Program: This program is contained in Project C2086 in this PE.</p> <p>(U) FY 2000 Planned Program:</p> <ul style="list-style-type: none"> • (U) \$ 1022 Explore and evaluate across a broad spectrum of commercially available technologies that can be incorporated into existing or new designs of individual clothing and equipment in an effort to reduce weight, increase survivability, increase lethality, improve safety, increase mobility, and improve combat performance of the individual Marine. (Marine load system product improvement, redesign, conduct testing and evaluation; improve jungle and desert boot; conduct boot outsole traction study to optimize performance of boot soles for traction, durability, and resole-ability; Body armor and light weight helmet ballistic testing to include cadaver testing and analysis of ballistic effects of shock forces of the torso, neck and spine; Review uniform sizing integration (less sizes covering same population with potential cost savings associated with stock and storage). Provide recommendation to uniform board on Marine uniform product improvements in an effort to reduce cost, utilize commercial manufacturing techniques, improve durability, and retain sharp appearance. <p>(U) \$ 200 Develop prototype for Multipurpose Health Service Facility for surgery, dental, pharmacy functions, etc.</p> <p>(U) Total \$ 1,222</p>											
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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	PROJECT																																	
BUDGET ACTIVITY	PE NUMBER AND TITLE																																			
7 - Operational System Development	0206623M Marine Corps Ground Combat/Supporting Arms Systems	February 1999	C2503																																	
<p>B. (U) Project Change Summary</p> <table border="1"> <thead> <tr> <th></th> <th>FY 1998</th> <th>FY 1999</th> <th>FY 2000</th> </tr> </thead> <tbody> <tr> <td>(U) Previous President's Budget</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>(U) Adjustments to Previous President's Budget</td> <td>0</td> <td>0</td> <td>1222</td> </tr> <tr> <td>(U) Current Budget Submit</td> <td>0</td> <td>0</td> <td>1222</td> </tr> </tbody> </table> <p>(U) Change Summary Explanation: (U) Funding: FY98 and FY99 program funding contained in Project C2086 in this PE. Increase in FY00 is due to the split of Initial Issue funding from Project C2086 into this Project and revised economic and general adjustments.</p> <p>(U) Schedule: N/A</p> <p>(U) Technical: N/A</p>					FY 1998	FY 1999	FY 2000	(U) Previous President's Budget	0	0	0	(U) Adjustments to Previous President's Budget	0	0	1222	(U) Current Budget Submit	0	0	1222																	
	FY 1998	FY 1999	FY 2000																																	
(U) Previous President's Budget	0	0	0																																	
(U) Adjustments to Previous President's Budget	0	0	1222																																	
(U) Current Budget Submit	0	0	1222																																	
<p>C. (U) Other Program Funding Summary (APPN, BLI #, NOMEIN)</p> <table border="1"> <thead> <tr> <th></th> <th>FY 1998</th> <th>FY 1999</th> <th>FY 2000</th> <th>FY 2001</th> <th>FY 2002</th> <th>FY 2003</th> <th>FY 2004</th> <th>FY 2005</th> <th>To Compl</th> <th>Total Cost</th> </tr> </thead> <tbody> <tr> <td>(U) PMC Line (BLI # 652200) Field Med Equip</td> <td>44279</td> <td>65593</td> <td>26693</td> <td>32173</td> <td>27662</td> <td>9202</td> <td>6022</td> <td></td> <td></td> <td></td> </tr> <tr> <td>(U) O&M Initial Issue</td> <td></td> <td></td> <td></td> <td></td> <td>27662</td> <td>28188</td> <td>28808</td> <td>29442</td> <td>Cont</td> <td>Cont</td> </tr> </tbody> </table> <p>(U) Related RDT&E</p>					FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost	(U) PMC Line (BLI # 652200) Field Med Equip	44279	65593	26693	32173	27662	9202	6022				(U) O&M Initial Issue					27662	28188	28808	29442	Cont	Cont
	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost																										
(U) PMC Line (BLI # 652200) Field Med Equip	44279	65593	26693	32173	27662	9202	6022																													
(U) O&M Initial Issue					27662	28188	28808	29442	Cont	Cont																										
<p>D. (U) Schedule Profile: N/A</p>																																				

R-1 Line Item 170

Budget Item Justification

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)				DATE	PROJECT
BUDGET ACTIVITY					
7 - Operational System Development					
PE NUMBER AND TITLE					
0206623M Marine Corps Ground Combat/Supporting Arms Systems					C2503
A. (U) Project Cost Breakdown					
Product Development	FY 1998	FY 1999	FY 2000		
	0	0	927		
Product Test	0	0	295		
Total	0	0	1222		
B. Budget Acquisition History and Planning Information					
Performing Organizations					
Contractor or Government	Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity	Project Office	Total Prior to FY 1998
Activity			EAC	EAC	
Product Development Organizations					
NATICK	MIPR	Oct 99			
USAMRA	MIPR	Oct 99			
Support and Management Organizations					
Test and Evaluation Organizations					
NATICK	MIPR	Oct 99			
AMED	MIPR	Oct 99			
Government Furnished Property					
Contract	Method/Type or Funding Vehicle	Award or Obligation Date	Delivery Date	Total Prior to FY 1998	Budget to Complete
Item Description				FY 1998	FY 1999
Product Development Property					FY 2000
Support and Management Property					
Test and Evaluation Property					
				R-1 Line Item 170	Budget Item Justification

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

February 1999

PE NUMBER AND TITLE

**0206623M Marine Corps Ground
Combat/Supporting Arms Systems**

C2503

Budget Item Justification

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BUDGET ACTIVITY		RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)							DATE	February 1999
7 - Operational System Development		0206624M Marine Corps Combat Services Support								
COST (In Thousands)	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
Total Program Element (PE) Cost	5288	4044	9817	4450	15568	5191	1377	273	Continuing	Continuing
C0076 Medium Tactical Vehicle Replacement (MTVR)	4376	1925	6814	1543	1535	0	0	0	0	31156
C0200 Light Tactical Vehicle Replacement (LTVR)	185	400	0	0	0	0	0	0	0	1329
C0201 Logistical Vehicle System Replacement (LVSR)	0	883	1055	1075	13025	4770	1111	2	0	22287
C2316 Combat Service Support Engineering Equipment	727	836	1702	1581	752	160	0	0	0	5758
C2509 Motor Transport Modification	0	0	246	251	256	261	266	271	Continuing	Continuing
Quantity of RDT&E Articles										

(U) **Mission Description and Budget Item Justification:** This program element (PE) provides funding for Marine Air-Ground Task Force requirements for Combat Service Support equipment improvements. It will enhance combat breaching capabilities of the ground combat elements, provide potable water from any available raw water source, logistics, maintenance and transportation requirements. It will also determine the reconfiguration of the current Twin Agent Unit firefighting apparatus and provide a portable, highly mobile general purpose automatic tester designed for use by technicians in the garrison and at the forward edge of the battlefield. The PE also provides improvements in all areas of Combat Service Support Equipment Vehicles by determining the replacement for the heavy, medium and light fleet vehicles.

(U) **Justification for Budget Activity:** This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it encompasses engineering and manufacturing development for upgrade of existing, operational systems.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February 1999
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT	
7 - Operational System Development		0206624M Marine Corps Combat Services Support								C0076	
COST (In Thousands)		FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
C0076	Medium Tactical Vehicle Replacement (MTVR)	4376	1925	6814	1543	1535	0	0	0	0	31156
Quantity of RDT&E Articles				8							
<p>A. (U) Mission Description and Budget Item Justification: The Medium Tactical Vehicle Replacement (MTVR) Program will determine the replacement vehicle for the Medium 5-ton fleet. This project will increase mobility, maintainability, and reliability for the medium fleet.</p> <p>(U) FY 1998 Accomplishments:</p> <ul style="list-style-type: none"> • (U) \$ 3144 Completed testing prototype vehicles provided by contractors. Durability testing, Reliability, Availability and Maintainability (RAM) testing. • (U) \$ 1139 Program documentation and management support for the MTVR program. • (U) \$ 93 Travel in support of the MTVR program. (U) Total \$ 4,376 <p>(U) FY 1999 Planned Program:</p> <ul style="list-style-type: none"> • (U) \$ 1,700 Begin variant prototype development. • (U) \$ 50 Travel in support of the MTVR program. • (U) \$ 135 Program documentation and management support for the MTVR program. • (U) \$ 40 Engineering Study. (U) Total \$ 1,925 <p>(U) FY 2000 Planned Program:</p> <ul style="list-style-type: none"> • (U) \$ 6500 Complete MTVR variant prototype development. • (U) \$ 120 Travel in support of the MTVR program. • (U) \$ 194 Program documentation and management support for the MTVR program. (U) Total \$ 6,814 											
										R-1 Line Item 171	Budget Item Justification

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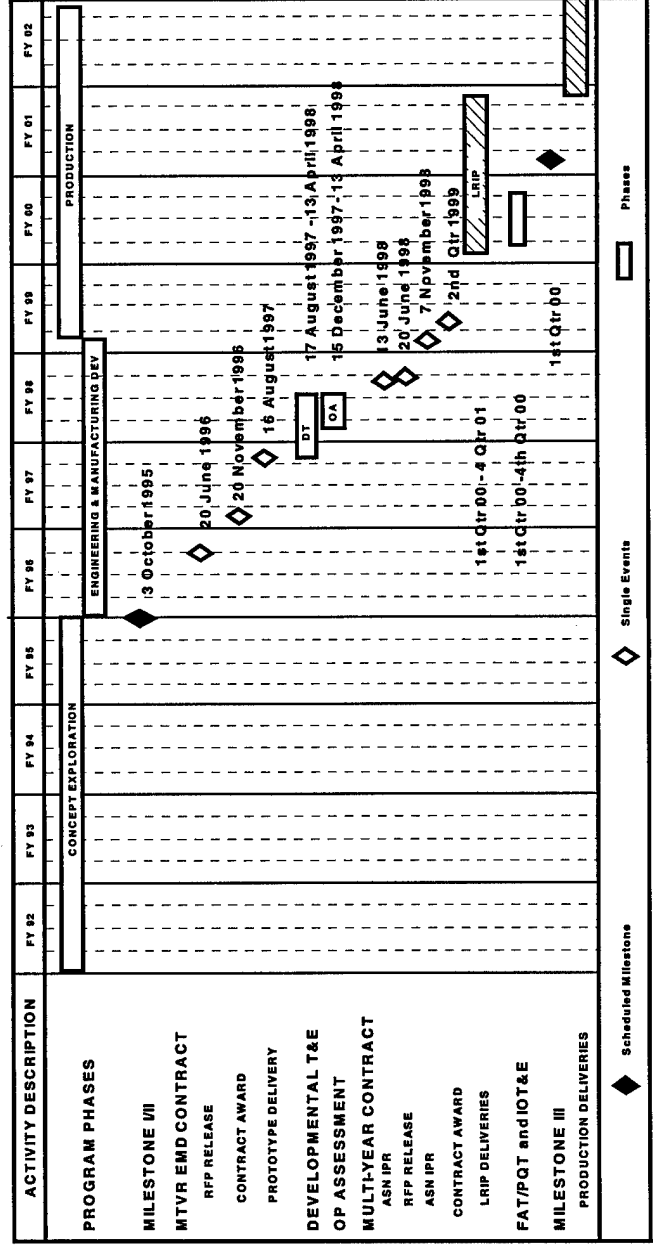
UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 1999
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
7 - Operational System Development	0206624M Marine Corps Combat Services Support	C0076	
B. (U) <u>Project Change Summary</u>			
(U) Previous President's Budget		<u>FY 1998</u>	<u>FY 1999</u> <u>FY 2000</u>
(U) Adjustments to Previous President's Budget		3836	1,968 8379
(U) Current Budget Submit		+540	-43 -1565
		4,376	1,925 6814
(U) Change Summary Explanation:			
(U) Funding: FY 1998 funding increase of \$540 thousand reflects cost increase for MTRV prototype testing. FY 1999 decrease of \$43 thousand reflects revised economic and general adjustments. FY 2000 decrease reflects program restructuring within the Marine Corps and revised economic and general adjustments.			
(U) Schedule: N/A			
(U) Technical: N/A			
C. (U) <u>Other Program Funding Summary</u>			
(APPN, BLI #, NOMEIN)			
(U) PMC Line (BLI# 508800) MTRV		<u>FY 1998</u> <u>FY 1999</u> <u>FY 2000</u> <u>FY 2001</u> <u>FY 2002</u> <u>FY 2003</u> <u>FY 2004</u> <u>FY 2005</u>	<u>To</u>
		0 69522 138268 325824 312128 380690 5880 530	<u>Compl</u> <u>Cost</u>
			0 1234842
(U) <u>Related RDT&E</u>			
(U) PE 0206623M Marine Corps Ground Combat Supporting Arms Systems			
(U) PE 0603640M Marine Corps Advanced Technology Demonstration			
(U) PE 0604804A Logistics and Engineering Equip/Engr Development			
(U) PE 0206313M Marine Corps Communications			
R-1 Line Item 171		Budget Item Justification	

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 1999
BUDGET ACTIVITY	PROJECT		
7 - Operational System Development	C0076		
PE NUMBER AND TITLE		0206624M Marine Corps Combat Services Support	

D. (U) Schedule Profile:

MEDIUM TACTICAL VEHICLE REPLACEMENT SCHEDULE



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Budget Item Justification

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE	February 1999	PROJECT	
BUDGET ACTIVITY										PE NUMBER AND TITLE			
7 - Operational System Development										0206624M Marine Corps Combat Services Support			C0076
A. (U) Project Cost Breakdown													
Product Development										FY 1998	FY 1999	FY 2000	
										0	1700	6500	
Support and Management										1232	225	314	
Test and Evaluation										3144	0	0	
Total										4376	1925	6814	
B. Budget Acquisition History and Planning Information													
Performing Organizations													
Contractor or Government													
Performing Activity													
Contract Method/Type or Funding Vehicle													
Award or Obligation Date													
Performing Activity EAC													
Project Office EAC													
Total Prior to FY 1998													
FY 1998													
FY 1999													
FY 2000													
Budget to Complete													
Total Program													
Product Development Organizations													
TACOM MIPR													
Support and Management Organizations													
TACOM MIPR													
MKI RCP													
MCSC WR													
CLNC RCP													
Test and Evaluation Organizations													
TACOM MIPR													

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)					DATE	February 1999	PROJECT
BUDGET ACTIVITY		PE NUMBER AND TITLE			C0076		
7 - Operational System Development		0206624M Marine Corps Combat Services Support			C0076		
Government Furnished Property							
Contract							
Item	Method/Type	Award or	Delivery	Total			Total
Description	or Funding	Obligation	Date	Prior to			Budget to
	Vehicle	Date		FY 1998	FY 1998	FY 1999	Complete
Product Development Property: N/A							
Support and Management Property: N/A							
Test and Evaluation Property: N/A							
				Total			Total
				Prior to			Program
				FY 1998	FY 1998	FY 1999	Complete
				10578	0	1700	0
				2331	1232	225	542
				2054	3144	0	2536
				14963	4376	1925	3078
							31156
Subtotal Product Development							
Subtotal Support and Management							
Subtotal Test and Evaluation							
Total Project							
R-1 Line Item 171							
Budget Item Justification							

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February 1999
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT	
7 - Operational System Development		0206624M Marine Corps Combat Services Support								C0201	
COST (In Thousands)		FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
C0201	Logistical Vehicle System Replacement (LVSR)	0	883	1055	1075	13025	4770	1111	2	0	22287
Quantity of RDT&E Articles						12					

A. (U) Mission Description and Budget Item Justification: The Logistics Vehicle System Replacement (LVSR) will provide a replacement vehicle system for the current fleet of LVS's, which are quickly approaching the end of their service life. The current LVS, procured in 1985, has a twenty year service life based on a mid-life rebuild beginning in FY95. That rebuild never occurred making the procurement of a replacement system essential. The LVSR is the Marine Corps heavy fleet vehicle system for transporting heavy bulk and break bulk cargo, bulk liquids (fuel and water), and ammunition. The LVSR will be comprised of a dual axle front power unit coupled to one of five interchangeable rear body units. These rear body units will allow the LVSR to fulfill various missions: transport standardized containers up to 20 ft., wrecker/vehicle recovery, 5th wheel semitrailer adapter, and self-loading ribbon bridge/container hauler/flatrack transport. The LVSR will address current heavy fleet deficiencies, including off-road mobility, ride quality, corrosion, stability, and braking. The increased speed, mobility, and fuel consumption of mechanized forces magnifies the inability of our current LVS to maintain the tempo needed to support the Marine Air Ground Task Force (MAGTF) in combat operations. Maneuver Warfare, Operational Maneuvers from the Sea (OMFTS), and Ship-to-Objective Maneuver (STOM) doctrines dictate that the LVSR, the Marine Corps primary bulk fuel and ammunition transport, be able to support high tempo operations over an enlarged battlespace and keep pace with rapidly moving and widely dispersed maneuver forces.

(U) FY 1998 Accomplishments:

- (U) \$ 0 N/A
- (U)Total \$ 0

(U) FY 1999 Planned Program:

- (U) \$ 500 Perform fabrication on LVSR technology demonstrator.
- (U) \$ 367 Program management, travel, analysis of alternatives/technology studies in support for LVSR program.
- (U) \$ 16 Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.
- (U)Total \$ 883

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Budget Item Justification

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE _____

February 1999

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

7 - Operational System Development

0206624M Marine Corps Combat Services Support C0201

(U) FY 2000 Planned Program:

- | | | |
|--------------|-------|---|
| • (U) \$ | 332 | Program management, travel, continue analysis of alternatives/technology studies in support for LVSR program. |
| • (U) \$ | 723 | Begin test and evaluation on technology demonstrator. |
| (U) Total \$ | 1,055 | |

B. (U) Project Change Summary

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
B. (U) Project Change Summary			
(U) Previous President's Budget	0	910	1031
(U) Adjustments to Previous President's Budget	0	-27	+24
(U) Current Budget Submit	0	883	1055

(U) Change Summary Explanation:

- | | |
|----------------|--|
| (U) Funding: | FY99 decrease of \$27K economic adjustment. |
| | FY00 increase of \$24K reflect program restructuring within the Marine Corps |
| (U) Schedule: | N/A |
| (U) Technical: | N/A |

C. (U) Other Program Funding Summary

(APPN, BLI #, NOMEN)

C. (U) Other Program Funding Summary (APPN, BLI #, NOMEN)	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	To Compl CONT.	Total Cost CONT.
(U) PMC Line (BLI #509300) LVSR	0	0	0	0	0	0	60079	89775		

(U) Related RDT&E

(U) PE 0206623M Marine Corps Ground Combat Supporting Arms Systems

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Budget Item Justification

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1999
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
7 - Operational System Development	0206624M Marine Corps Combat Services Support	C0201

D. (U) Schedule Profile:

**Logistics Vehicle System Replacement
(LVSR)**

ACTIVITY DESCRIPTION	FY 99	FY 00	FY 01	FY 02	FY 03	FY 04	FY 05	FY 06	FY 07	FY 08
OVERALL	<div style="display: flex; justify-content: space-between;"> Vehicle Development Vehicle Production Vehicle Support </div>									
MILESTONE	<div style="display: flex; justify-content: space-between;"> 0 I/I III IOC FOC </div>									
PROGRAM	<div style="display: flex; justify-content: space-between;"> CONCEPT EXPLORATION ADL ADL ADL </div>									
DEVELOPMENTAL	<div style="display: flex; justify-content: space-between;"> Development Development Development </div>									
OPERATIONAL	<div style="display: flex; justify-content: space-between;"> Operational Operational </div>									
LVSR EMD	<div style="display: flex; justify-content: space-between;"> EMD </div>									
RFP RELEASE	<div style="display: flex; justify-content: space-between;"> </div>									
CONTRACT AWARD	<div style="display: flex; justify-content: space-between;"> </div>									
PROTOTYPE DELIVERY	<div style="display: flex; justify-content: space-between;"> </div>									
PRODUCTION	<div style="display: flex; justify-content: space-between;"> </div>									
SPO and DOWN SELECT	<div style="display: flex; justify-content: space-between;"> </div>									
EXERCISE LIMP OPTION	<div style="display: flex; justify-content: space-between;"> </div>									
EXERCISE PRP OPTION	<div style="display: flex; justify-content: space-between;"> </div>									
	<div style="display: flex; justify-content: space-between;"> Scheduled Milestone Single Events Phases </div>									

Budget Item Justification

R-1 Line Item 171

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)					DATE	February 1999	PROJECT
BUDGET ACTIVITY					PE NUMBER AND TITLE		C0201
7 - Operational System Development					0206624M Marine Corps Combat Services Support		
Government Furnished Property					Total		
Contract							
Item Description	Method/Type or Funding Vehicle	Award or Obligation Date	Delivery Date	Total Prior to FY 1998	FY 1998	FY 1999	FY 2000
Product Development Property							
Support and Management Property							
Test and Evaluation Property							
Subtotal Product Development					Total Prior to FY 1998	FY 1998	FY 1999
Subtotal Support and Management							
Subtotal Test and Evaluation							
Total Project							
					Budget to Complete		Total Program

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE	February 1999
BUDGET ACTIVITY		PE NUMBER AND TITLE									PROJECT
7 - Operational System Development		0206624M Marine Corps Combat Services Support									C2316
COST (In Thousands)		FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
Combat Service Support Engineering Equipment		727	836	1702	1581	752	160	0	0	0	5758
Quantity of RDT&E Articles											

A. (U) Mission Description and Budget Item Justification: This project includes improvements in all areas of Combat Service Support Equipment. The Army developed Combat Breacher Vehicle (CBV) will be a fully tracked, armored vehicle capable of keeping pace with the maneuver force. It will breach minefields with a full width mine plow, (14 feet wide), equipped with automatic depth control while maintaining speeds of 4 to 5 miles per hour. The CBV, also referred to as the Grizzly, is a full-tracked, heavy-protection level combat system being developed by the Army to enhance the combat breaching capabilities of the ground combat elements. The overall system is integrated on the M1 chassis to provide commonality with the tank fleet while providing the latest technology in direct fire armor protection and will provide capabilities to breach minefields, neutralize obstacles, demolish berms, and fill in auto-tank ditches. Major subsystems of the CBV include an automatic depth control system, a weapon systems station, a commander's control station, and a power driven arm. The Marine Corps is coordinating with the Army to establish a joint program. The 1500 Reverse Osmosis Water Purification Unit (1500ROWPU) is capable of providing potable water from any available raw water source. The 1500ROWPU is "state-of-the-art" technology producing 1,200/1,500 gallons per hour (GPH). This system will replace the aging 600 GPH ROWPUs at a 2 old systems to 1 enhanced system ratio. The 1500ROWPU will reduce logistics, maintenance, and transportation requirements allowing significant potential cost avoidance in out year support costs. The 1500ROWPU is a joint Marine Corps program with the Army as the lead service. The current Twin Agent Unit (TAU) firefighting apparatus is mounted on a modified Commercial Utility, Cargo Vehicle (CUCV). The CUCV has reached its service life and was phased out of the Marine Corps' inventory by FY 1997. Funds will be used to determine the reconfiguration of the current TAU and the Truck, Utility, Cargo, D1180, into a compatible mobile extinguisher. The Third Echelon Test Set (TETS) is a portable, highly mobile general purpose automatic tester designed for use by technicians both in garrison and at the forward edge of the battlefield.

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Budget Item Justification

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 1999
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
7 - Operational System Development	0206624M Marine Corps Combat Services Support	C2316	
FY 1998 Accomplishments:			
• (U) \$ 419	1500ROWPU: Designed/fabricated working 1500ROWPU prototype to confirm the design decisions based on componentry testing.		
• (U) \$ 104	TETS: Initiated research of Electro-Optic (EO) Test Requirements and capabilities of Commercial and other Services EO Tester. Developed new technology testing applications in support of emerging Weapon System by Automatic Test Support Unit (ATSU), Albany, GA.		
• (U) \$ 72	COMPRESSED AIR FOAM SYSTEM MOBILE: Procured two (2) prototypes from General Services Administration (GSA) Schedule.		
• (U) \$ 85	COMPRESSED AIR FOAM SYSTEM MOBILE: Begin Developmental testing.		
• (U) \$ 47	COMPRESSED AIR FOAM SYSTEM MOBILE: Technical and Logistical Support		
(U)Total \$	727		
(U) FY 1999 Planned Program:			
• (U) \$ 704	1500 ROWPU: Prototype changes to componentry to optimize the design hardware.		
• (U) \$ 110	TETS: Develop new technology testing applications in support of emerging weapon systems.		
• (U) \$ 22	SBIR: Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638		
(U)Total \$	836		
(U) FY 2000 Planned Program:			
• (U) \$ 1592	CBV: Design and develop mechanically deployed CBV blade. Test amphibious shipboard compatibility.		
• (U) \$ 110	TETS: Continue development of new technology testing applications in support of emerging weapon systems.		
(U)Total \$	1,702		
B. (U) Project Change Summary			
(U) Previous President's Budget	FY 1998	FY 1999	FY 2000
(U) Adjustments to Previous President's Budget	836	1756	1586
(U) Current Budget Submit	-109	-920	+116
	727	836	1702
(U) Change Summary Explanation:			
(U) Funding: FY98 decreased to support higher priority requirements. FY99 decreased to delay CBV blade mechanical deployment. FY00 increases reflects program restructuring within the Marine Corps.			
(U) Schedule: N/A			
(U) Technical: N/A			
R-1 Line Item 171		Budget Item Justification	

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February 1999
BUDGET ACTIVITY										PROJECT	
7 - Operational System Development										C2316	
PE NUMBER AND TITLE										0206624M Marine Corps Combat Services Support	
C. (U) Other Program Funding Summary (APPN, BLI #, NOMEN)											
	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost	
(U) PMC Line (BLI# 613300) CBV	0	0	0	0	0	28631	150186	226743	Cont	Cont	
(U) PMC Line (BLI# 627400) 1500ROWPU	0	0	0	0	12762	13277	11670	8316	Cont	Cont	
(U) PMC Line (BLI# 666900) CAFMS	0	1137	0	0	0	0	0	0	0	1137	
(U) PMC Line (BLI# 440200) TETS	12445	29245	29068	4781	0	0	0	0	0	75539	
(U) PMC Line (BLI# 667000) ILT \$5Million(CAFMS)	0	0	3443	0	0	0	0	0	0	3443	
(U) Related RDT&E											
(U) PE 0206623M Marine Corps Ground Combat Supporting Arms Systems											
(U) PE 0603640M Marine Corps Advanced Technology Demonstration											
(U) PE 0604804A Logistics and Engineering Equip/Engr Development											
(U) PE 0206313M Marine Corps Communications											
D. (U) Schedule Profile: N/A											
										Budget Item Justification	
										R-1 Line Item 171	

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)					DATE	PROJECT
BUDGET ACTIVITY						
7 - Operational System Development					0206624M	Marine Corps Combat Services Support C2316
					PE NUMBER AND TITLE	
					FY 1998	FY 1999
					FY 2000	
A. (U) <u>Project Cost Breakdown</u>						
Production Development					595	816
Support and Management					47	20
Test and Evaluation					85	0
Total					727	836
B. <u>Budget Acquisition History and Planning Information</u>						
<u>Performing Organizations</u>						
Contractor or Contract						
Government Method/Type						
Performing or Funding						
Activity Vehicle						
Award or Obligation Date						
Performing Activity EAC						
Project Office EAC						
Total Prior to FY 1998						
FY 1998						
FY 1999						
FY 2000						
Budget to Complete						
Total Program						
Product Development Organizations						
Miscellaneous Various						
TACOM MIPR						
Support and Management Organizations						
MKI RCP						
MCSC						
Test and Evaluation Organizations						
TACOM MIPR						

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)					DATE	February 1999	PROJECT
BUDGET ACTIVITY					PE NUMBER AND TITLE		
7 - Operational System Development					0206624M Marine Corps Combat Services Support		
Government Furnished Property							
Item Description	Method/Type or Funding Vehicle	Award or Obligation Date	Delivery Date	Total Prior to FY 1998	FY 1998	FY 1999	FY 2000
Contract							
Product Development Property: Not Applicable							
Support and Management Property: Not Applicable							
Test and Evaluation Property: Not Applicable							
Subtotal Product Development							
Subtotal Support and Management							
Subtotal Test and Evaluation							
Total Project							

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February 1999								
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT									
7 - Operational System Development		0206624M Marine Corps Combat Services Support								C2509									
COST (In Thousands)		FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost								
C2509 Motor Transport Modification		0	0	246	251	256	261	266	271	Continuing	Continuing								
Quantity of RDT&E Articles																			
<p>A. (U) Mission Description and Budget Item Justification: This project develops joint service and Marine Corps unique improvements to motor transport systems, monitors the commercial automotive industrial base for technology insertions to increase Reliability Availability and Maintainability (RAM-D), reduce ownership costs, and resolve unplanned safety hazards. This also includes the monitoring and implementation of state and federal requirements if required. This will be a "level of effort" program to quickly analyze and field items that address safety modifications and product improvements to current systems that increase combat readiness and capability. Funding will focus on streamlined acquisitions of Commercial-Off-the-Shelf/Non-Developmental Item (COTS/NDI) items that can be identified, integrated, and tested in a short amount of time. Successful modifications will be later procured and fielded to the Fleet Marine Force (FMF).</p> <p>(U) FY 1998 Accomplishments: Not Applicable. (V)</p> <p>(U) FY 1999 Planned Program: Not Applicable.</p> <p>(U) FY 2000 Planned Program:</p> <ul style="list-style-type: none"> • (U) \$ 39 Program Management and travel in support of Motor Transport modifications. • (U) \$ 108 Develop kits for Motor Transport modifications utilizing COTS/NDI. • (U) \$ 99 Begin testing, integration and evaluation on Motor Transport modifications which utilize COTS/NDI. <p>(U) Total \$ 246</p>																			
<p>B. (U) Project Change Summary</p> <table border="0" style="width: 100%;"> <tr> <td style="width: 33%;"></td> <td style="width: 33%; text-align: center;">FY 1998</td> <td style="width: 33%; text-align: center;">FY 1999</td> <td style="width: 33%; text-align: center;">FY 2000</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> </table> <p style="text-align: right;">R-1 Line Item 171</p> <p style="text-align: right;">Budget Item Justification</p>													FY 1998	FY 1999	FY 2000				
	FY 1998	FY 1999	FY 2000																

(Exhibit R-2, Page 17 of 18)

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EXHIBIT R-2, FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0207161N

PROGRAM ELEMENT TITLE: TACTICAL AIR INTERCEPT

(U) COST: (Dollars in Thousands)

<u>Project Number & Title</u>	<u>FY 1998 Budget</u>	<u>FY 1999 Budget</u>	<u>FY 2000 Estimate</u>	<u>FY 2001 Estimate</u>	<u>FY 2002 Estimate</u>	<u>FY 2003 Estimate</u>	<u>FY 2004 Estimate</u>	<u>FY 2005 Estimate</u>	<u>To Complete</u>	<u>Total Program</u>
E0457 AIM-9X	55,120	64,626	40,051	17,503	5,699	1,927	799	1,531	0	260,396
TOTAL	55,120	64,626	40,051	17,503	5,699	1,927	799	1,531	0	260,396

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The AIM-9X Sidewinder program is a joint USN/USAF effort to continue the evolutionary development of the AIM-9 missile. The AIM-9X is the long-term evolution of the AIM-9 that will provide a series of modifications to the AIM-9 improving seeker/guidance and kinematic performance and will be fielded in the post-2000 timeframe. Funding for AIM-9X activities beyond FY 1994 is provided equally by the USN and USAF. The test articles are engineering developmental assets for proving missile performance in support of the LRIP DAB decision.

R-1 ITEM NO. 172

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET DATE: February 1999

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0207161N** **PROJECT NUMBER: E0457**
PROGRAM ELEMENT TITLE: TACTICAL AIR INTERCEPT **PROJECT TITLE: AIM-9X**

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1998 BUDGET	FY 1999 BUDGET	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
E0457 AIM-9X	55,120	64,626	40,051	17,503	5,699	1,927	799	1,531	0	260,396
RDT&E,N Articles		9	15	2						26

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The AIM-9X Sidewinder program is a joint USN/USAF effort to continue the evolutionary development of the AIM-9 missile. The AIM-9X is the long term evolution of the AIM-9 that will provide a series of modifications to the AIM-9 improving seeker/guidance and kinematic performance which will be fielded in the post-2000 timeframe. Funding for AIM-9X activities beyond FY 1994 is provided equally by the USN and USAF. The test articles are engineering developmental assets for proving missile performance in support of the LRIP DAB decision.

(U) B. JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it encompasses engineering and manufacturing development for modifying existing, operational systems.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1998 ACCOMPLISHMENTS: (Navy Share Only)

- (U) (\$34,216) Continued engineering manufacturing development (EMD), conducted Design Review II (DR II), flew Captive Test Units, and started delivery of safe separation vehicles for Developmental Test-IIB (DT-IIB).
- (U) (\$7,590) Continued to provide aircraft interface information to EMD contractor to include available wind tunnel data.

R-1 ITEM NO. 172

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0207161N

PROGRAM ELEMENT TITLE: TACTICAL AIR INTERCEPT

PROJECT NUMBER: E0457

PROJECT TITLE: AIM-9X

- (U) (\$9,552) Continued monitoring EMD contract, continued DT-IIA flight testing, complete DT-IIA within the fourth quarter, began preparations for DT-IIB, initiated DT-IIB, and provided consulting services support.
- (U) (\$1,980) Headquarters/field travel.
- (U) (\$1,782) Began digital upgrade modification to LAU-7 launcher.

2. FY 1999 PLAN: (Navy Share Only)

- (U) (\$31,505) Continue EMD efforts.
- (U) (\$9,110) Continue providing aircraft interface to the EMD contractor. Relate results of wind tunnel testing to missile/platform interface and compatibility efforts.
- (U) (\$18,763) Continuation of EMD contractor monitoring, complete DT-IIB, start DT-IIC, begin Operational Test-IIA (OT-IIA), and provide consulting services support.
- (U) (\$1,917) Headquarters/field travel.
- (U) (\$2,770) Continue digital upgrade to LAU-7 launcher.
- (U) (\$561) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. FY 2000 PLAN: (Navy Share Only)

- (U) (\$19,635) Continue EMD efforts.
- (U) (\$1,320) Continue providing aircraft interface to the EMD contractor in support of OT-IIA, DT-IID and Operational Flight Program (OFP 15C).

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Exhibit R-2a, RDT&E Project Justification
(Exhibit R-2a, Page 3 of 8)

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0207161N PROJECT NUMBER: E0457
PROGRAM ELEMENT TITLE: TACTICAL AIR INTERCEPT PROJECT TITLE: AIM-9X

- (U) (\$17,346) Continue providing Government flight test support through implementation of OT-IIA and DT-IIID and Government engineering support to the EMD activities and provide consulting services support.
- (U) (\$1,750) Headquarters/field travel.

(U) B. PROGRAM CHANGE SUMMARY:

(U) FY 1999 President's Budget:	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
	57,946	65,855	42,711
(U) Appropriated Value:	57,946	65,855	
(U) Adjustments from PRESBUDG:	-2,826	-1,229	-2,660
(U) FY 2000/2001 President's Budget Submit:	55,120	64,626	40,051

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Exhibit R-2a, RDT&E Project Justification
(Exhibit R-2a, Page 4 of 8)

EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET **DATE: February 1999**

PROGRAM ELEMENT: 0207161N
PROGRAM ELEMENT TITLE: TAC

CHANGE SUMMARY EXPLANATION:

(U) Schedule: Test article delivery schedule revised to reflect EMD schedule changes. LRIP DAB revised to 3rd Qtr of FY 00 based on revised test schedule.

(U) C. OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands):

(U) RELATED RDT&E:

(U) AF PE 0207161F (TACTICAL AIM MISSILE)

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0207161N

PROJECT NUMBER: E0457

PROGRAM ELEMENT TITLE: TACTICAL AIR INTERCEPT

PROJECT TITLE: AIM-9X

(U) D. ACQUISITION STRATEGY: The Acquisition Decision Memorandum (ADM) dated December 3, 1996 approved program entry into Engineering and Manufacturing Development (E&MD). A contract with Hughes Aircraft Company for E&MD was awarded December 13, 1996. Retrofitting of components will extend the operational effectiveness of existing inventories at an affordable cost while continuing evolution of the AIM-9 series. The E&MD contract is a Cost Plus Incentive Fee/Award Fee. In December 1997, Hughes Missile Systems Company became Raytheon Missile Systems Company as a result of Raytheon's acquisition of Hughes.

(U) E. SCHEDULE PROFILE:

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>TO COMPLETE</u>
(U) Program Milestones			3Q/00 LRIP DAB	2Q/02 MSIII
(U) Engineering Milestones	2Q DR II		2Q/00 TRR TECHEVAL	1Q/01 TRR for OPEVAL
(U) T&E Milestones	4Q/98-1Q/00 DT-IIB/C	4Q/99-1Q/00 OT-IIA	1Q/00-4Q/00 DT-IID	2Q/01-4Q/01 OT-IIB
(U) Contract Milestones			2Q/00 LRIP	

R-1 ITEM NO. 172

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DATE: February 1999

EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

PROJECT NUMBER: E0457
PROJECT TITLE: AIM-9X

PROGRAM ELEMENT: 0207161N

BUDGET ACTIVITY: 7

<u>Cost Categories:</u>	<u>Contract Method & Type</u>	<u>Performing Activity & Location</u>	<u>*Total Prior Yrs Cost</u>	<u>FY 1999 Award</u>		<u>FY 2000 Award</u>		<u>Cost to Complete</u>	<u>Total Cost</u>	<u>**Target Value of Contract</u>
				<u>Cost</u>	<u>Date</u>	<u>Cost</u>	<u>Date</u>			
DEM/VAL	C/CPIF	Hughes Tucson AZ	6,685	0		0		0	6,685	22,600
	C/CPIF	Raytheon	8,587	0		0		0	8,587	24,900
EMD	C/CPIF/AF	Bedford MA Hughes	56,509	27,949	OCT 98	16,313	OCT 99	10,281	111,052	193,500
EMD Award Fee Aircraft Integration	C/CPIF	Tucson, AZ McDonnell-Douglas St. Louis, Mo St. Louis, Mo	5,250 13,967	3,556 9,110	NOV 99 OCT 98	3,322 1,320	NOV 00 OCT 99	1,768	13,896 24,397	27,792
Engineering Services	WX	NAWCWD, CL	26,237	17,393	NOV 98	17,373	NOV 99	10,684	72,916	
Miscellaneous I/H (Efforts <\$1.0M)	Various	Various	4,780	1,648	NOV 98	777	NOV 99	1,611	8,816	
LAU-7 Launcher		McDonnell-Douglas	1,782	2,770					4,552	
Contract (P ³)	TBD	St. Louis, Mo TBD						2,404	2,404	2,404
Subtotal Product Development			123,797	63,655		39,105		26,748	253,305	
Remarks: Target Value of Contract for DEM/VAL, EMD and Award Fee includes Air Force Funding										
Support Costs included in Management										
Subtotal Support			0	0		0		0	0	0

Remarks:
Award Fee is 12% of the Target Cost and is broken into four increments. The first award fee period was applied in July 1998.
*FY95 and prior funded under P.E. 0603715D. FY96-98 funded under P.E. 0207161N. **Target Value includes both Navy and Air Force Funding.

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Exhibit R-3, Project Cost Analysis
(Exhibit R-3, Page 7 of 8)

UNCLASSIFIED

DATE: February 1999

EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

PROJECT NUMBER: E0457
PROJECT TITLE: AIM-9X

PROGRAM ELEMENT: 0207161N

BUDGET ACTIVITY: 7

<u>Contract Method & Type</u>	<u>Performing Activity & Location</u>	<u>Total Prior Yrs Cost</u>	FY 1999		FY 2000		<u>Cost to Complete</u>	<u>Total Cost</u>	<u>Target Value of Contract</u>
			<u>Cost</u>	<u>Award Date</u>	<u>Cost</u>	<u>Award Date</u>			

Cost Categories:

All costs for test and evaluation are included in product development

Subtotal Test & Evaluation

Remarks:

Contract Engineering Support	ID/IQ, T&M	Endmark Arlington, VA	2,750	1,000	Dec 98	500	Dec 99	0	4,250	4,250
Program Management Support Travel	TBD	TBD	1,088 625	383 256	Dec 98	250	Dec 99	493	743	1,471
	ID/IQ, T&M	NSM PMA 259 IPT							196	218
Subtotal Management SBIR Assessment			4,463	1,639 561		946		711	7,759 561	

Remarks:

Total Cost	128,260	64,626	40,051	27,459	260,396
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R-1 ITEM NO. 172

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Exhibit R-3, Project Cost Analysis
(Exhibit R-3, Page 8 of 8)

UNCLASSIFIED
EXHIBIT R-2, FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0207163N**
PROGRAM ELEMENT TITLE: AMRAAM

(U) COST: (Dollars in Thousands)

<u>Project Number & Title</u>	<u>FY 1998</u> <u>Budget</u>	<u>FY 1999</u> <u>Budget</u>	<u>FY 2000</u> <u>Estimate</u>	<u>FY 2001</u> <u>Estimate</u>	<u>FY 2002</u> <u>Estimate</u>	<u>FY 2003</u> <u>Estimate</u>	<u>FY 2004</u> <u>Estimate</u>	<u>FY 2005</u> <u>Estimate</u>	<u>To</u> <u>Complete</u>	<u>Total</u> <u>Program</u>
E0981 AMRAAM	5,475	4,674	13,544	12,311	11,035	8,405	9,877	10,175	Cont.	Cont.
TOTAL	5,475	4,674	13,544	12,311	11,035	8,405	9,877	10,175	Cont.	Cont.

Quantity of RDT&E Articles

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This joint Navy/Air Force program is structured in response to the Joint Service Operational Requirement and Mission Element Need Statement to develop an air superiority air-to-air missile with significant improvements in operational utility and combat effectiveness. This program supports the integration of the AMRAAM into Navy aircraft with analysis of Navy unique applications, simulation capability development, aircraft missile integration tasks, pre-planned product improvement (P3I) efforts, and procurement of hardware to support Navy test and evaluation tasks. This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it encompasses engineering and manufacturing development for upgrade of existing, operational systems.

R-1 Item No. 173
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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

PROJECT NUMBER: E0981
PROJECT TITLE: AMRAAM

PROGRAM ELEMENT: 0207163N
PROGRAM ELEMENT TITLE: AMRAAM

BUDGET ACTIVITY: 7

(U) COST: (Dollars in Thousands)

<u>Project Number & Title</u>	<u>FY 1998 Budget</u>	<u>FY 1999 Budget</u>	<u>FY 2000 Estimate</u>	<u>FY 2001 Estimate</u>	<u>FY 2002 Estimate</u>	<u>FY 2003 Estimate</u>	<u>FY 2004 Estimate</u>	<u>FY 2005 Estimate</u>	<u>To Complete</u>	<u>Total Program</u>
TOTAL	5,475	4,674	13,544	12,311	11,035	8,405	9,877	10,175	Cont.	Cont.
Quantity of RDT&E Articles										

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This joint Navy/Air Force program is structured in response to the Joint Service Operational Requirement and Mission Element Need Statement to develop an air superiority air-to-air missile with significant improvements in operational utility and combat effectiveness. This program supports the integration of the AMRAAM into Navy aircraft with analysis of Navy unique applications, simulation capability development, aircraft missile integration tasks, pre-planned product improvement (P3I) efforts, and procurement of hardware to support Navy test and evaluation tasks.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1998 ACCOMPLISHMENTS:

- (U) (\$5,475) Continued systems engineering and participation in AMRAAM P3I Phase 2 EMD and Phase 3 risk reduction program (incorporating additional Air Force funding of (\$39,181) with emphasis on Navy unique requirements and aircraft integration compatibility requirements. Participate in Joint Tactical Air-to-Air Missile Office (JTAAMO) Air-to-Air Joint Assessment Roadmap activities.

**R-1 Item No. 173
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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

**PROGRAM ELEMENT: 0207163N
PROGRAM ELEMENT TITLE: AMRAAM**

**PROJECT NUMBER: E0981
PROJECT TITLE: AMRAAM**

2. FY 1999 PLAN:

- (U) (\$4,575) Initiate systems engineering and participation in AMRAAM P3I Phase 3 EMD program (incorporating additional Air Force funding of \$34,613) with emphasis on Navy unique compatibility requirements and aircraft integration compatibility requirements. Conduct P3I Phase 3 System Design Review. Continue JTAAMO Air-to-Air Roadmap activities.
- (U) (\$99) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. FY 2000 PLAN:

- (U) (\$13,544) Continue systems engineering/aircraft integration activities in AMRAAM P3I Phase 3 EMD program (incorporating additional Air Force funding of \$49,783) conducting proof of design (POD) testing of Phase 3 components with emphasis on Navy unique compatibility requirements and aircraft integration compatibility requirements. Conduct Phase 3 Preliminary Design Reviews. Continue JTAAMO Air-to-Air Roadmap activities including technology studies.

**R-1 Item No. 173
UNCLASSIFIED**

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

PROJECT NUMBER: E0981
PROJECT TITLE: AMRAAMBUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0207163N
PROGRAM ELEMENT TITLE: AMRAAM

(U) B. PROGRAM CHANGE SUMMARY

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
(U) FY1999 President's Budget:	5,479	4,862	4,647
(U) Appropriated Value:	5,700	4,862	
(U) Adjustments from President's Budget:	-4	-188	8,897
(U) FY2000 President's Budget Submit:	5,475	4,674	13,544

CHANGE SUMMARY EXPLANATION:

(U) Funding: The FY 1998 reduction of -\$4 thousand was for Small Business Innovative Research. The FY1999 decrease of -\$188 thousand was for various minor pricing adjustments. The FY2000 increase is to fund the Navy's share of Pre-planned Product Improvement (P3I) Phase 3 efforts.

(U) Schedule: The revised schedule is consistent with a one-stage P3I Phase 3 program vice the schedule estimate when a two stage P3I Phase 3 was envisioned.

(U) Technical: None.

(U) C. OTHER PROGRAM FUNDING SUMMARY

Appn WPN/P1#6 Qty \$	FY 1998 Budget 120 54,088	FY 1999 Budget 100 51,135	FY 2000 Estimate 100 46,261	FY 2001 Estimate 100 46,385	FY 2002 Estimate 100 54,804	FY 2003 Estimate 100 54,989	FY 2004 Estimate 100 52,845	FY 2005 Estimate 100 53,996	To Complete 436 234,646

Related RDT&E

(U) PE 0207130F F-15
 (U) PE 0204136N F/A-18 Squadrons
 (U) PE 0207163F AMRAAM P3I
 (U) PE 0207133F F-16
 (U) PE 0604239F F-22
 (U) PE 0207134F F-15E

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

PROJECT NUMBER: E0981
PROJECT TITLE: AMRAAM

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0207163N**
PROGRAM ELEMENT TITLE: AMRAAM

(U) D. ACQUISITION STRATEGY: With the December 1997 merger of Raytheon and Hughes into the Raytheon Systems Company, the government implemented a new acquisition strategy labeled AMRAAM Vision 2000. The Vision 2000 strategy capitalizes on the hardware pricing agreement between Raytheon and the government under the auspices of the Department of Justice, and supported the Raytheon/Hughes merger and a shift in government business practices toward a more "commercial" business arrangement. The procurement lot 12 contract award includes an overarching price control strategy and the transfer of Total System Performance Responsibility (TSPR) to the Raytheon Defense Systems Segment in Tucson, Arizona. The purchase includes missiles, warranties, spares, missile performance tracking and assessments, and reliability tests. Raytheon assumes control and responsibility for all specifications below missile performance. Also included in this contract are pre-priced options for lots 13-15, awarded in FY99

(U) E. SCHEDULE PROFILE

To Complete

FY 2000

FY 1999

(U) Program Milestones

1Q P3I-3
 EMD CTK AWD

(U) Engineering Milestones

3Q P3I-3 SDR

3Q P3I-3 PDR

P3I-3 CDR

(U) T&E Milestones

4Q P3I-2
 FLT TEST

(U) Contract Milestones

R-1 Item No. 173
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DATE: February 1999

EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

PROJECT NUMBER: E0981
PROJECT TITLE: AMRAAM

PROGRAM ELEMENT: 0207163N

BUDGET ACTIVITY: 7

<u>Cost Categories:</u>	<u>Contract Method & Type</u>	<u>Performing Activity & Location</u>	<u>Total Prior Yrs Cost</u>	<u>FY 1999 Cost</u>	<u>FY 1999 Award Date</u>	<u>FY 2000 Cost</u>	<u>FY 2000 Award Date</u>	<u>Cost to Complete</u>	<u>Total Cost</u>	<u>Target Value of Contract</u>
Product Development	SS/CPAF	ASC EGLIN AFB, FL	1671	1/99	1/99	9386	11/99	8263	Cont.	TBD
Award Fee		ASC EGLIN AFB, FL	312	1/99	1/99	1656	11/99	1458	Cont.	TBD
Product Development	WX	NAWC-WD Pt. Mugu, CA	175	11/98	11/99	179	11/99	183	Cont.	TBD

Subtotal Product Development

2158 11221 9904 Cont.

Remarks:

Support	SS/CPAF	ASC EGLIN AFB, FL	72	1/99	11/99	75	11/99	77	Cont.	TBD
Award Fee		ASC EGLIN AFB, FL	13	1/99	11/99	13	11/99	14	Cont	TBD
Support	SS/FFP	JHU/APL	510	4/99	4/00	366	4/00	370	Cont.	TBD
Support	RX	LAUREL MD NSMA	1292	1/99	12/99	1325	12/99	1288	Cont.	TBD
Support	WX	VA NAWC-WD Pt. Mugu, CA	120	10/98	10/99	120	10/99	128	Cont.	TBD

Subtotal Support

2007 1899 1877 Cont.

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Exhibit R-3, Project Cost Analysis
(Exhibit R-3, Page 6 of 7)

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EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

DATE: February 1999

PROJECT NUMBER: E0981
PROJECT TITLE: AMRAAM

PROGRAM ELEMENT: 0207163N

BUDGET ACTIVITY: 7

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999		FY 2000		Cost to Complete	Total Cost Cont.	Target Value of Contract
				Cost	Award Date	Cost	Award Date			
Test and Evaluation	TBD	TBD		150	1/99	154	10/99	250		TBD
Subtotal Test & Evaluation				150		154		250	Cont.	
Remarks:										
Management	Travel Orders	PMA268 EGLIN AFB FL		260		270		280	Cont.	TBD
Subtotal Management SBIR Assessment				260 99		270		280	Cont.	
Remarks:										
Total Cost				4674		13544		12311	Cont.	TBD

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**FY 2000 President's Budget Estimates
EXHIBIT R-2, RDT&E,N Budget Item Justification**

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0303109N

PROGRAM ELEMENT TITLE: Satellite Communications

(U)	Cost (\$ in Thousands)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Total PE Cost		18,062	17,523	38,921	12,946	11,819	15,824	7,978	8,158	CONT.	CONT.
X0728 EHF SATCOM Terminals		14,789	15,523	8,491	7,415	6,686	7,803	7,978	8,158	CONT.	CONT.
X0731 Fleet Satellite Communications		3,273	2,000	2,829	1,514	1,025	0	0	0	CONT.	CONT.
P2472 Mobile User Segment		0	0	27,601	4,017	4,108	8,021	0	0	0	43,747

A. Mission Description and Budget Item Justification:

(U) **MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:** The Navy Extremely High Frequency (EHF) Satellite Communications (SATCOM) Program (NESP) provides for the development and production of terminals to provide anti-jam, low probability of intercept/detection communications capability for Command and Control of the fleet. NESP operates with FLTSAT EHF packages and UFO EHF Satellite packages and is the Navy's portion of Milstar. The Milstar program is comprised of satellites, control stations, and aircraft, ship, and ground terminals to provide assured worldwide, secure, anti-jam, survivable communications for the National Command Authority, CINCs, and operational commanders.

(U) Fleet Satellite Communications includes Sensitive Compartmented Information (SCI) Automated Digital Network System (ADNS)/Tactical Intelligence Information Exchange Subsystem II Plus (TACINTEL II+) which provides real time indications and warning support and enhanced SCI interoperability with other services, agencies, and allies permitting a level of integration not available with current systems.

(U) The Mobile User Segment program develops the next generation DoD narrowband communications satellite constellation. The current UHF Follow-On (UFO) constellation is expected to degrade below acceptable availability parameters and will require replacement by FY07. In addition, new user requirements have been identified and validated as improvements in warfighter tactics, and strategies have been modified to incorporate new concepts and technologies. The joint Mobile User Objective System (MUOS) Integrated Product Team (IPT) has developed an acquisition strategy based on the exponential growth of narrowband communications demands, which has resulted in identifying the need to explore new approaches to acquiring satellite based communications capabilities. This program builds on state of the art technologies and commercial practices to develop a totally responsive joint warfighter system.

(U) An eleventh UFO satellite is being procured as a gapfiller to maintain the current UFO constellation until the MUOS can be put in place. The UFO receiver used on all previous UFOs is obsolete and no longer available. The contractor will develop and test a replacement UHF receiver for the UFO gapfiller satellite.

(U) **JUSTIFICATION FOR BUDGET ACTIVITY:** This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it encompasses engineering and manufacturing development for upgrade of existing, operational system.

R-1 Shopping List - Item No 176-1 of 176-18

UNCLASSIFIED

Exhibit R-2, RDT&E,N Budget Item Justification

UNCLASSIFIED
FY 2000 President's Budget Estimates
EXHIBIT R-2a, RDT&E,N Project Justification

DATE: February 1999

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0303109N** **PROJECT NUMBER: X0728**
PROGRAM ELEMENT TITLE: Satellite Communications **PROJECT TITLE: EHF SATCOM Terminals**

Cost (\$ in Thousands)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
------------------------	---------	---------	---------	---------	---------	---------	---------	---------	------------------	------------

X0728 EHF SATCOM Terminals	14,789	15,523	8,491	7,415	6,686	7,803	7,978	8,158	CONT.	CONT.
Quantity of RDT&E Articles & cost										

A. Mission Description and Budget Item Justification:

(U) Navy Extremely High Frequency (EHF) Satellite Communications (SATCOM) Program provides for the development and production of terminals to provide anti-jam, low probability of intercept/detection communications capability for Command and Control of the fleet. The terminals will provide physical and electromagnetically survivable, worldwide communications in the current and projected electromagnetic and nuclear threat environments. Navy EHF terminals are interoperable with Army and Air Force terminals and will operate with Milstar as well as EHF packages on-board Ultra High Frequency (UHF) Follow-On (UFO) Satellites 4 through 10 and FLTSATCOM Satellites 7 and 8. The increased capability provided by EHF terminals is accomplished by use of the wider bandwidths available at extremely high frequencies, narrow antenna beamwidths, spread spectrum techniques, on-board satellite processing, and advanced signal processing technology.

(U) A Medium Data Rate (MDR) capability is currently under development to utilize the capabilities on Milstar satellites DFS-3 through DFS-6. MDR will provide the only protected (jam resistant and low probability of intercept/detection) MDR data rates from 4.8 kilobits per second (Kbps) to 1.544 megabits per second (Mbps) to the majority of the fleet.

(U) The Navy EHF Communications Controller (NECC) provides automated, netted tactical data Information Exchange Subsystems (IXS) over jam resistant EHF satellite links. The NECC will provide for load and channel sharing, resource management, communications management and planning, network control and monitoring, and services including circuit switching, packet switching, and backward compatibility to UHF SATCOM.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1998 ACCOMPLISHMENTS:

- (U) (\$ 8,462) Delivered additional EDM MDR modem and modification kits; continue MDR ILS development; complete MDR software development; continue MDR SATSIM development; and perform system integration testing to meet MST testing schedule.
- (U) (\$ 1,504) Performed developmental and interoperability testing (MST-6000) with Navy MDR terminal, Army MDR terminal, and the on-ground flight model Milstar MDR satellite to verify compatibility prior to launch of first Milstar satellite in FY 99.
- (U) (\$ 1,031) Continued development of NECC interface with MDR.

UNCLASSIFIED
FY 2000 President's Budget Estimates
EXHIBIT R-2a, RDT&E,N Project Justification

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0303109N

PROJECT NUMBER: X0728
PROJECT TITLE: EHF SATCOM Terminals

PROGRAM ELEMENT TITLE: Satellite Communications

- (U) (\$ 1,039) Commenced development of Submarine Reportback Compression/Encryption capability to provide transmit and receive message processing for reportback messages to support tactical brevity coding, reportback message compression, and KGV-11 time of day encryption.
- (U) (\$ 294) Developed and updated Naval Command, Control, Communications, Computers, Intelligence, Sensors and Reconnaissance (C4ISR) implementation guidance.
- (U) (\$ 2,459) Continued Milstar terminal and MDR development engineering analysis and management.

R-1 Shopping List -- Item No 176-3 of 176-18

UNCLASSIFIED

Exhibit R-2a, RDT&E,N Project Justification (X0728)

UNCLASSIFIED
FY 2000 President's Budget Estimates
EXHIBIT R-2a, RDT&E,N Project Justification

DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0303109N PROJECT NUMBER: X0728
PROGRAM ELEMENT TITLE: Satellite Communications PROJECT TITLE: EHF SATCOM Terminals

2. (U) FY 1999 PLAN:

- (U) (\$ 6,504) Perform MDR software corrections resulting from MST-6000 testing with flight model MDR satellite. Continue MDR ILS development; prepare MDR software documentation; perform software configuration management; perform system testing; support installation, checkout, and integration of EDM antenna/pedestals on operational platforms, EDM MDR modems, and field change kits in support of MST testing; and complete MDR SATSIM development and modifications.
- (U) (\$ 600) Perform ship and shore integration for MDR upgrade.
- (U) (\$ 1,600) Perform MST-8000 development testing with initial AN/USC-38(V) with MDR, Army MDR terminal, and on-orbit Milstar satellite with MDR to verify compatibility.
- (U) (\$ 2,809) Perform TECHEVALs/OPEVALs for Navy MDR and participate in Milstar MDR IOT&E.
- (U) (\$ 1,500) Continue development of NECC modifications. Conduct developmental and operational testing of MDR capable NECC units.
- (U) (\$ 1,500) Develop modifications required to maintain compatibility with future EHF satellite constellations (i.e., Advanced EHF). Investigate antenna technology advancements including phased array and flat plate antennas. Begin investigation of Radar Cross Section (RCS) vulnerability reduction measures.
- (U) (\$ 1,010) Continue Milstar terminal and MDR development engineering analysis and management.

3. (U) FY 2000 PLAN:

- (U) (\$ 2,408) Complete MDR Satellite Simulator (SATSIM) development and support EDM MDR modems.
- (U) (\$ 1,062) Continue testing for Navy MDR and participate in Milstar MDR IOT&E for multiple MDR constellations.
- (U) (\$ 1,610) Continue development of TIP/NECC modifications.
- (U) (\$ 2,400) Continue Advanced EHF system engineering analysis and specification generations.
- (U) (\$ 1,011) Continue Milstar terminal and MDR development engineering analysis and management.

R-1 Shopping List - Item No 176-4 of 176-18

UNCLASSIFIED

Exhibit R-2a, RDT&E,N Project Justification (X0728)

UNCLASSIFIED
FY 2000 President's Budget Estimates
EXHIBIT R-2a, RDT&E,N Project Justification

DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0303109N PROJECT NUMBER: X0728
PROGRAM ELEMENT TITLE: Satellite Communications PROJECT TITLE: EHF SATCOM Terminals

B. (U) PROGRAM CHANGE SUMMARY:

	1998	1999	2000
(U) FY 99 President's Budget	\$15,464	\$16,068	\$8,595
(U) Appropriated Value			
(U) Adjust. from FY 99 PRESBUDG	(\$675)	(\$545)	(\$104)
(U) FY 00 President's Budget Submit	\$14,789	\$15,523	\$8,491

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding:

FY 1998 reflects a \$1k FY1998 Update
FY 1998 Congressional undistributed general adjustment since the President's Budget.
FY 1999 reflects the following (\$-545K) issues: **64128**: Sec. 8108 Revised Economic Assumptions, **64231**: Civilian Personnel Underexecution, **64440**: Sec.8054 Contract Advisory and Assistance Service, **65606**: Sec.8034 FFRDC Distribution.
FY 2000 reflects the following (\$117K) issues: **66212**: PBD 606 Civilian Pay Rates, **66547**: PBD 604 Non Pay Inflation.
(U) Schedule: Not applicable.

(U) Technical: Not applicable.

B. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in Thousands)

	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	TO COMPLETE	TOTAL PROGRAM
OPN SHIP* 321000	39,579	56,910	89,900							
OPN SHORE* 2,195		14,793	32,215							

*Includes EHF terminal installation costs.

(U) Related RDT&E:
(U) PE 0303603F, Milstar

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Exhibit R-2a, RDT&E,N Project Justification (X0728)

UNCLASSIFIED
 FY 2000 President's Budget Estimates
 EXHIBIT R-2a, RDT&E,N Project Justification

DATE: February 1999

PROJECT NUMBER: X0728
 PROJECT TITLE: EHF SATCOM Terminals

PROGRAM ELEMENT: 0303109N
 PROGRAM ELEMENT TITLE: Satellite Communications

BUDGET ACTIVITY: 7

(U) PE 0303601F, Air Force Satellite Communications
 (U) PE 0303142A, Army Extremely High Frequency Communications Terminal

C. (U) ACQUISITION STRATEGY:

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
Program Milestones	N/A	MS IV (MDR Full Rate Prod) 6/99	Milstar II Launch (Flight 4) 1/00
Engineering Milestones	N/A	N/A	N/A
T&E Milestones	MDR MST6000 7/98	MDR MST8000 3/99 MDR OT 5/99	N/A
Contract Milestones	MDR Initial Prod Award 1/98	N/A	N/A

D. SCHEDULE PROFILE: See paragraph C.

UNCLASSIFIED
FY 2000 President's Budget Estimates
EXHIBIT R-3, RDT&E,N Project Cost Analysis

DATE: February 1999

PROJECT NUMBER: X0728

PROGRAM ELEMENT: 0303109N

BUDGET ACTIVITY: 7

Cost Categories	Contract Method & Type	Performing Activity & Location	Total Pys Cost	FY 99 Cost	FY 99 Award Date	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Product Development												
Prime Mission Equipment	SS/CPFF	Raytheon Marlborough, MA	29,501	8,578	12/98	5,228	12/99			CONT	CONT	
Prime Mission Equipment	WR	SSC SD	10,194	2,594	11/98	493	11/99			CONT	CONT	
Prime Mission Equipment	Various	Other	4,641	938	12/98	99	12/99			CONT	CONT	
Subtotal Product Development			44,336	12,110		5820				CONT	CONT	
Remarks:												
Support Cost/Management Services												
	WR	SSC SD	5,532	840	12/98	446	12/99			CONT	CONT	
	WR	NUWC	4,712	417	12/98	365	12/99			CONT	CONT	
	Various	Other	3,676	325	12/98	309	12/99			CONT	CONT	
Subtotal Support			13,920	1,582		1,120				CONT	CONT	
Remarks:												

R-1 Shopping List - Item No 176-7 of 176-18

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Exhibit R-3, RDT&E,N Project Cost Analysis

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 FY 2000 President's Budget Estimates
 EXHIBIT R-3, RDT&E,N Project Cost Analysis

DATE: February 1999

PROJECT NUMBER: X0728

PROGRAM ELEMENT: 0303109N

BUDGET ACTIVITY: 7

Cost Categories	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 99 Cost	FY 99 Award Date	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Test & Evaluation												
Test & Evaluation	Various	Various	3,566	1,831	12/98	1,551	12/99			CONT	CONT	
Subtotal T&E			3,566	1,831		1,551				CONT	CONT	
Remarks												
Management Services												
Subtotal Management												
Remarks												
Total Cost			61,822	15,523		8,491				CONT	CONT	
Remarks												

R-1 Shopping List - Item No 176-8 of 176-18
 UNCLASSIFIED

Exhibit R-3, RDT&E,N Project Cost Analysis

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FY 2000 President's Budget Estimates
EXHIBIT R-2a, RDT&E,N Project Justification

DATE: February 1999

PROJECT NUMBER: X0731

PROGRAM ELEMENT: 0303109N

BUDGET ACTIVITY: 7

Cost (\$ in Thousands)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
X0731 Fleet Satellite Communications	3,273	2,000	2,829	1,514	1,025				CONT.	CONT.

A. Mission Description and Budget Item Justification:

(U) The Sensitive Compartmented Information (SCI) Automated Digital Network System (ADNS)/Tactical Intelligence Information Exchange Subsystem II Plus (TACINTEL II+) implements the Integrated Special Intelligence Communications portion of the Copernicus Joint Maritime Communications System (JMCOMS)/ADNS architecture, to provide services for transfer of Special Intelligence (SI) information between ships, aircraft, and shore activities in support of joint and combined operations. SCI ADNS/TACINTEL II+ will provide real time indications and warning support to joint and component commanders through reliable high speed transfer of sensor data and intelligence information. Enhanced interoperability with other services, agencies, and allies will permit a level of integration of SI operations not achievable with current systems. The Joint ultra high frequency (UHF) Military Satellite Communications Network Integrated Control System (JMINI) Control system will provide dynamic centralized control of joint 5-kHz and 25kHz UHF military satellite communications (MILSATCOM) voice and data resources (channels and Time Division Multiple Access (TDMA) time slots via a globally integrated system of four control stations to be located at each of the three Naval Computer and Telecommunications Area Master Station (NCTAMS) sites plus Naval Computer and Telecommunications Station (NCTS) Guam.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1998 ACCOMPLISHMENTS:

- (U) (\$2940) Implemented advanced SCI ADNS/TACINTEL II+ into ADNS. Begin design, implementation, system/software test documentation support on the Network Management Systems (NMS) to support the JMINI Control System.
- (U) (\$333) Developed and updated Naval Command, Control, Communications, Computers, Intelligence, Sensors and Reconnaissance (C4ISR) implementation guidance.

2. (U) FY 1999 PLAN:

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Exhibit R-2a, RDT&E,N Project Justification

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FY 2000 President's Budget Estimates
EXHIBIT R-2a, RDT&E,N Project Justification

DATE: February 1999

PROJECT NUMBER: X0731

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0303109N

- (U) (\$ 2,000) Continue implementation of SCI ADNS/TACINTEL II+.

R-1 Shopping List - Item No 176-10 of 176-18
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Exhibit R-2a, RDT&E,N Project Justification

UNCLASSIFIED
FY 2000 President's Budget Estimates
EXHIBIT R-2a, RDT&E,N Project Justification

DATE: February 1999

PROJECT NUMBER: X0731

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0303109N

3. (U) FY 2000 PLAN:

- (U) (\$ 2,829) Transition SCI ADNS/TACINTEL II+ functionality to Windows NT/IT 21 compliant architecture to include re-hosting to Cryptologic Workstation environment. Integrate and implement SCI ADNS Build II. Continue development of voice, data and video integration into SCI ADNS environment. Preparation for SCI Defense Messaging System integration. Developmental Testing (DT) and Follow on Operational Testing and Evaluation (FOT&E) of SCI ADNS/TACINTEL II+.

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding:

FY98: Joint Staff decision- JWCA issue: N6 plus-up \$2,491K and FY 1998 Update -\$10K.

FY 99: Reflects a net -\$120K for issues: 64128, 64231, 64440

FY 00 Reflects a net +\$31K for issues: 66212, 66547

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

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UNCLASSIFIED

Exhibit R-2a, RDT&E,N Project Justification

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FY 2000 President's Budget Estimates
EXHIBIT R-2a, RDT&E,N Project Justification

DATE: February 1999

BUDGET ACTIVITY: 7		PROGRAM ELEMENT: 0303109N					PROJECT NUMBER: X0731		
B. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in Thousands)									
	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY2004	FY2005	TOTAL TO COMPLETE PROGRAM
OPN SHIP*	1972	2,649	4,892						CONT.
321000									CONT.
									CONT.

*Includes terminal installation costs.
(U) Related RDT&E: N/A

C. (U) ACQUISITION STRATEGY:

	FY 1998	FY 1999	FY 2000	
Program Milestones	N/A	N/A	SCI ADNS 2 IOC 6/00	
Engineering Milestones	N/A	N/A	SCI ADNS 2 PCA 3/00	
T&E Milestones	SCI ADNS 1 DT 9/98	SCI ADNS 1 OT1 7/99	SCI ADNS DT 7/00 OT 9/00	
Contract Milestones	N/A	N/A	N/A	

R-1 Shopping List - Item No 176-12 of 176-18
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Exhibit R-2a, RDT&E,N Project Justification

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FY 2000 President's Budget Estimates
EXHIBIT R-3, RDT&E,N Project Cost Analysis

DATE: February 1999

PROJECT NUMBER: X0731

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0303109N

D. SCHEDULE PROFILE: See paragraph C.

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY's Cost	FY 99 Cost	FY 99 Award Date	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	Cost To Complete	Total Cost	Target Value of Contract
1.1.1.1 Prime Mission Product	FPI	Titan	6,309	0		0		0		0	6,309	
1.1.1.1 Prime Mission Product	FPF	SRC	18,505	0		0		0		0	18,505	
1.1.1.1 Prime Mission Product	PD	NAVSUP/SR C	3,946	1,395	Dec 98	2,194	Dec 99			1,597	9,132	
1.1.1.1 Prime Mission Product	VAR	VAR	9,654	125	Dec 98	100	Dec 99			200	10,079	
Subtotal Product Development			38,414	1,520		2,294				1,797	44,025	
Remarks:												

1.1.1.1 Prime Mission Product	CPFF	CSC	3,588	0		0		0		0	3,588	
1.1.1.1 Prime Mission Product	PD	NAVAIR/ISC	1,176	0		0		0		0	1,176	
1.1.1.1 Prime Mission Product	VAR	VAR	9,343	0		0		0		0	9,343	
GFE												
Subtotal Support			14,107	0		0		0		0	14,107	
Remarks												

R-1 Shopping List - Item No 176-13 of 176-18
UNCLASSIFIED

Exhibit R-3, RDT&E,N Project Cost Analysis

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FY 2000 President's Budget Estimates
EXHIBIT R-3, RDT&E,N Project Cost Analysis

DATE: February 1999

PROJECT NUMBER: X0731

PROGRAM ELEMENT: 0303109N

BUDGET ACTIVITY: 7

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 99 Cost	FY 99 Award Date	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	Cost To Complete	Total Cost	Target Value of Contract
1.2.5 System T&E	N/A	SSC SD	0	267	Dec 98	322	Dec 99		Dec 00	448	1,037	
1.2.5 System T&E	N/A	OPTEVFOR	0	80	Dec 98	80	Dec 99		Dec 00	160	320	
1.2.5 System T&E	VAR	VAR	9,296	0		0		0		0	9,296	
Subtotal T&E			9,296	347		402				608	10,653	
Remarks												
1.1.3 Program Management	CPFF	CSC	3,588								3,588	
1.1.3 Program Management	PD	NAVAIR/ISC	1,176								1,176	
1.1.3 Program Management	N/A	ACS	410	133	Dec 98	133	Dec 99		Dec 00	134	810	
1.1.3 Program Management	VAR	VAR	9,343								9,343	
Subtotal Management			14,517	133		133				134	14,917	
Remarks												
Total Cost			76,334	2,000		2,829				2,539	83,702	
Remarks												

R-1 Shopping List - Item No 176-14 of 176-18

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Exhibit R-3, RDT&E,N Project Cost Analysis

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FY 2000 President's Budget Estimates

EXHIBIT R-2a, RDT&E,N Project Justification

DATE: February 1999

PROJECT NUMBER: P2472
PROJECT TITLE: Mobile User Segment

PROGRAM ELEMENT: 0303109N
PROGRAM ELEMENT TITLE: Satellite Communications

BUDGET ACTIVITY: 7

Cost (\$ in Thousands)

PROJECT NUMBER & TITLE	FY 1998 ACTUAL	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
P2472 Mobile User Segment	0	0	27,601	4,017	4,108	8,021	0	0	0	43,747

A. Mission Description and Budget Item Justification:

(U) This program provides for: (1) the development of the digital receiver for the UHF Follow-On (UFO) F11 gapfiller satellite and (2) the development of the next generation DoD narrowband communications satellite constellation.

(U) The RDT&E effort for the UFO F11 gapfiller satellite is to develop and test a digital receiver to replace the obsolete analog receiver used on UFO F1-F10. The F11 is being procured to maintain the health of the UFO constellation until the Mobile User Objective System (MUOS) system can be put in place. The analog receiver used earlier is no longer available since the parts for the analog receiver were bought early in the UFO program.

(U) The current UFO constellation is expected to degrade below acceptable availability parameters and will require replacement by FY07. In addition, new user requirements have been identified and validated as improvements in warfighter tactics, and strategies have been modified to incorporate new concepts and technologies. The joint MUOS Integrated Product Team (IPT) has developed an acquisition strategy based on the exponential growth of narrowband communications demands, which has resulted in identifying the need to explore new approaches to acquiring satellite based communications capabilities. This program builds on state of the art technologies and commercial practices to develop a totally responsive joint warfighter system.

(U) This RDT&E effort supports the program objectives by assisting in identifying the cheapest, fastest, most effective way to field a new system by FY07. A draft over-arching communication satellite system Technical Requirements Document (TRD) has been developed by the MUOS IPT as the basic planning document. The TRD incorporates the latest understanding of the joint user needs and transposes these to high level technical performance requirements. From the TRD, in its final form, the prime system contractor will generate the SATCOM system specification from which will flow the technical development and production specifications. It is planned to use industry teams to conduct early evaluation of the TRD, and to identify risk management areas and candidate systems approaches.

R-1 Shopping List - Item No 176-15 of 176-18

UNCLASSIFIED

Exhibit R-2a, RDT&E,N Project Justification (P2472)

UNCLASSIFIED

FY 2000 President's Budget Estimates
EXHIBIT R-2a, RDT&E,N Project Justification

DATE: February 1999

PROJECT NUMBER: P2472
PROJECT TITLE: Mobile User Segment

PROGRAM ELEMENT: 0303109N
PROGRAM ELEMENT TITLE: Satellite Communications

BUDGET ACTIVITY: 7

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY98 ACCOMPLISHMENTS:

- (U) (\$0) N/A

2. (U) FY99 PLAN:

- (U) (\$0) N/A

3. (U) FY00 PLAN:

- (U) (\$4,000) Prepare a final draft TRD for government review and approval. Begin development of draft SATCOM System Specifications.
- (U) (\$23,601) Design and test a digital receiver for UFO F11 gapfiller.

B. (U) PROGRAM CHANGE SUMMARY:

(U) Funding: N/A This project starts in FY00.

(U) Schedule: N/A

(U) Technical: N/A

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in Thousands)

NUMBER TITLE	FY 1998 ACTUAL	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) WPN Line 243300 Fleet Satellite Communication Follow-On	0	0	9,789	167,711	1,961	1,932	50,020	61,109	CONT.	CONT.

(U) RELATED RDT&E: None

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Exhibit R-2a, RDT&E,N Project Justification (P2472)

UNCLASSIFIED

FY 2000 President's Budget Estimates

EXHIBIT R-2a, RDT&E,N Project Justification

DATE: February 1999

PROJECT NUMBER: P2472
PROJECT TITLE: Mobile User Segment

PROGRAM ELEMENT: 0303109N
PROGRAM ELEMENT TITLE: Satellite Communications

BUDGET ACTIVITY: 7

D. (U) SCHEDULE PROFILE:

	<u>FY 1998</u>	<u>FY 1999</u> 4Q-PDM/AP	<u>FY 2000</u> 1Q-MS 0
Program Milestones			
Engineering Milestones			4Q-Final TRD 4Q-Draft Spec
T&E Milestones			
Contract Milestones			1Q-Multiple contracts Award

UFO GAPFILLER

Program Milestone	
Engineering Milestone	
T&E Milestone	SS/FFP
Contract Milestone	1Q-Mod for F11

R-1 Shopping List - Item No 176-17 of 176-18

UNCLASSIFIED

Exhibit R-2a, RDT&E,N Project Justification (P2472)

UNCLASSIFIED

EXHIBIT R-2, FY 2000 PRESIDENT'S BUDGET ESTIMATES

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0303140N

PROGRAM ELEMENT TITLE: Information Systems Security Program

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	TO COMPLETE	TOTAL PROGRAM
X0734 Information Systems Security										
17,287	21,003	22,978	23,712	24,436	24,962	27,151	27,951	CONT.		CONT.
17,287	21,003	22,978	23,712	24,436	24,962	27,151	27,951	CONT.		CONT.
TOTAL										

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The goal of the Navy Information Systems Security (INFOSEC) Program (ISSP) is to ensure the continued protection of Navy and Joint information and information systems from hostile exploitation and attack. With the advent of the information age, the network environment, and the evolving reliance on distributed information systems that communicate via computer networks, protecting these networks, the data flowing on the networks, and the attached information systems has become critical to the effective performance of the Navy mission. The fundamental nature of these distributed systems in modern Naval and Joint war fighting means that attacks against the systems are increasingly likely. An adversary has a much broader selection of attack types from which to choose than in the past. In addition to the traditional attacks that involve the theft or eavesdropping of information, attacks involving malicious changes to critical information, changes to the functioning of critical systems, or the destruction of systems and networks have become much more feasible. Since many Navy information systems are based on commercially available technologies, an adversary often has access to the very technologies that are targeted for exploitation.

(U) Owing to the attack variety, the complexity of Navy distributed systems, and the rapid rate of change of the underlying commercial and government technologies; the provision of security is an increasingly complex and ever changing problem. Technologies involved with providing security are a mix of computer security, network security, and cryptographic security technologies which must be carefully developed and integrated into many parts of the Navy information infrastructure. The placement of technologies and the mix of technologies required must evolve quickly to meet the rapidly evolving threats and vulnerabilities. This is a departure from years past when protections were mostly associated with the eavesdropping threat and were primarily provided by cryptographic devices. In order to gain the requisite levels of protection, the various security technologies must be applied in a carefully architected manner. Information Assurance (IA) is the comprehensive management of both the information and the information system security disciplines. At the same time the IA problem is becoming more complex, demands to move information between security levels and to and from coalition partners are increasing.

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(U) The Navy ISSP RDT&E program is structured to stay abreast of the exploding information system security problem in Navy and ensure that Navy systems possess the requisite level of protection. To model the way DOD information systems are evolving (rather than being one-time developments), the ISSP RDT&E program is structured to continuously evaluate technical directions/options. The program develops frameworks and architectures based on mission threats, exploitation risks, and integrated Joint information system efforts, etc. The program provides the efforts and resources to determine the proper security functions and placement of the functions; uses the frameworks and architectures to coordinate Navy work with DoD and National Security Agency (NSA) IA efforts. The program also examines commercial technologies to determine their fit with the architectures; provides feedback to vendors and standards bodies about what Navy requires in commercial products. It develops or tailors technologies, standards, and processes to Navy requirements if necessary; prototypes systems or portions of systems and examines their operational utility in operational Navy settings, and provides IA expertise and engineering to Navy and Joint information system developments. All technology development efforts are aimed at specific Navy and Joint IA problems and are aimed to transition to procurement as soon as ready.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it encompasses engineering and manufacturing development for upgrade of existing, operational systems.

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EXHIBIT R-2, FY 2000 PRESIDENT'S BUDGET ESTIMATES

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0303140N

PROGRAM ELEMENT TITLE: Information Systems Security Program

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	TO COMPLETE	TOTAL PROGRAM CONT.
X0734 Information Systems Security	17,287	21,003	22,978	23,712	24,436	24,962	27,151	27,951	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Navy RDT&E program analyzes existing information assurance products and solutions, and develops improved, interoperable communications security equipment and methods, computer security technology and other high assurance techniques/solutions to protect voice, video and data communications from exploitation and provide IA for critical Navy information systems. This program element is a continuing effort to modernize obsolete computer security and cryptographic equipment and ancillaries with state-of-the-art replacements in order to meet the evolving threat. Communication Security (COMSEC) replacements, in most cases, will use embedded modules (using NSA approved crypto engines) and programmable cryptographic technology. The technical strategy and framework efforts are focused on the use of IA technology (e.g., COMSEC and COMPUSEC technology) to counter a wide variety of INFOSEC threats in a Navy environment. Processes and tools are being evaluated, developed and/or tested to design and evaluate the security of systems that integrate information assurance products. Technology base efforts are: developing new secure voice algorithms and prototypes; developing technology for a new family of programmable COMSEC modules; development of network security products, which are designed to interconnect networks of dissimilar classification, and address the Multi-level Security (MLS) technology requirements for the DON, and assessing a variety of potentially high pay-off NSA and industry products. The resulting expertise is applied to a wide variety of Navy development programs that must integrate IA technology.

(U) The expertise in the DON RDT&E program is applied to the development of Navy INFOSEC products and systems, computer and other high assurance technology, development of missing technology (e.g., network security technology and certification methods), and the development of standards, processes and tools, etc). Specific emphasis is being placed on evaluation, integration and test of Contractor off-the-shelf (COTS)/Non-developmental Item (NDI) IA security products into prototype capabilities such as firewalls, guards and monitoring systems to provide for monitoring, detecting, isolating and reacting MDIR to network intrusions throughout the DON. With the Navy now making profound changes in the way it approaches communications and computer security, the current operating environment has virtually eliminated the traditional distinction between telecommunications and information systems. The Navy RDT&E program analyzes existing INFOSEC and high assurance equipment and solutions, and develops improved, interoperable communications security equipment and methods to protect information from exploitation and provide IA for

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BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0303140N
PROGRAM ELEMENT TITLE: Information Systems Security Program

critical Navy systems. The project provides a continuing effort to modernize obsolete cryptographic and network security equipment and ancillaries with state-of-the-art replacements in order to meet the evolving threat on Navy communication networks. Because INFOSEC is a cradle-to-grave discipline, this program develops the technology and methodology to systems in development, production and operation, and develops the infra-structure needed to support and evaluate the security of deployed systems. These objectives are pursued by using equipment/systems focusing on information assurance technology and their use and impact on distributed information systems.

(U) Under the Navy Secure Voice program, technology to provide high grade, secure tactical and strategic voice connectivity shall be developed and assessed. Additional efforts shall focus on architectures, designing, demonstrating and integrating a secure voice capability for IT-21 and other Command, Control, Communications and Computers (C4I) programs and initiatives. Gateway technology to address Navy unique point-to-multipoint communications shall be developed in support of IT-21 and the Naval Virtual Intranet (NVI). This technology will comprise the secure voice communications suite of equipment for shipboard applications, as well as shore-based sites. Under the Navy Security Management Infrastructure (SMI) program, new emerging technology and enhanced capabilities shall be developed, evaluated and applied to the Electronic Key Management System (EKMS) and other Navy Information Systems. Additional efforts shall focus on the architecture, design, and development of systems to manage the security parameters (for example, encryption keys) necessary to the operation of the systems developed by the Secure Data and Secure Voice portions of the ISSP. This includes the application of Public Key Infrastructure and Certificate Management Infrastructure (PKI/CMI) technology, and the development of a Single Point Command, Control and Keying (SPC²K) solution to support emerging, embedded cryptographic technology. Under the Secure Data program, efforts focus on architectures, designing, acquiring, demonstrating and integrating the IA technologies into Navy distributed information systems (IT-21, NVI). It involves the injection of the technologies and solutions in Navy C⁴I systems to maintain pace with the evolving infrastructure of the internet and expanding network capabilities of ashore and afloat users. Secure data RDT&E, focuses primarily on designing and proving IA solutions for IT-21 and the NVI. This portion of the ISSP supports delivery of network security engineering expertise needed to stand-up the NVI and securely deploy IT-21 constituent systems such as Joint Maritime Communications (JMCMS), Joint Maritime Command Information System (JMCIS), and Base Level Information Infrastructure (BLII). It also provides solutions to the coalition operations problem and to the Navy cryptographic equipment obsolescence problem.

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PROGRAM ELEMENT: 0303140N

PROGRAM ELEMENT TITLE: Information Systems Security Program

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1998 ACCOMPLISHMENT:

- (U) (\$300) Complete development of the Embeddable INFOSEC Product (EIP).
- (U) (\$250) Continue development of PEIP prototype.
- (U) (\$6,671) Perform development demonstrations, software design reviews, and development, integration and system testing for Tier 1 Phase 1.
- (U) (\$1,117) Continue development and begin testing of Tiers 2 and 3 components.
- (U) (\$1,810) Provide developmental systems security engineering, Certification, and Accreditation (C&A) support to Navy information systems such as Defense Messaging System (DMS) and Multi-Level Information System Security Initiative (MISSI). This will include systems security engineering support to Navy tactical and non-tactical systems, that are required to incorporate DMS and MISSI evolving technology. Particular emphasis will be directed to system engineering associated with implementation of DMS and MISSI technology into tactical systems, including those associated with Top Secret and Secure Compartmented Information (SCI) systems.
- (U) (\$1,030) Develop and test network security solutions for Navy information systems. This will include the high assurance components associated with Top Secret and SCI system solutions.
- (U) (\$1,033) Continue development of integrated security architectures for Naval INFOSEC systems, both for C4I systems and non-C4I systems. This will include refinements of interim, incremental security architectures that display how MISSI, Electronic Key Management System (EKMS), and Secure Terminal Equipment (STE) security technology will be integrated into Navy systems. The architectures will include analysis of all technical issues and related concepts of operations associated with the architectures. Develop requirements for mid-term INFOSEC products that may be required. Continue to analyze achieved INFOSEC performance in operational systems. Include latest operational requirements, technical opportunities and new threat information.
- (U) (\$405) Continue to participate in revising/refining INFOSEC standards to reflect evolving capabilities. Refine INFOSEC engineering guideline documents as directed by the CNO/Marine Corps co-chaired INFOSEC Steering Group. In coordination with NSA, continue refinements to automated tools to accomplish systems C&A.

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- (U) (\$879) Develop secure voice integrated shipboard architecture incorporating NSA STE products and integrating COTS assessments of the latest NSA and industry INFOSEC technology and demonstrations of prototype voice systems. Continue research into new INFOSEC voice technology.
- (U) (\$386) Develop and update Naval Command, Control, Communications and Computers Information Surveillance and Reconnaissance (C4ISR) implementation guidance. Develop and update Naval C4ISR mission to incorporate an overarching systems, technical and information architectures. Conduct associated C4ISR analysis and studies.
- (U) (\$906) Reflects realignment of Navy Vulnerability Assessment and Countermeasures (NVACM) under the INFOSEC Program. Continue vulnerability assessments and information warfare threat assessments in support of critical developing information systems. Continue development, evaluation, integration and prototype of COTS/NDI network countermeasures capabilities to MDIR unwanted intrusions into Navy information systems.
- 2. (U) FY 1999 PLAN:
 - (U) (\$2,110) Continue development of the programmable embedded COMSEC prototype and begin integration and system testing. The first targeted application is the Submarine LF/VLF VME Bus Receiver (SLVR) system for replacement of the KG-3X family of cryptos. Initiate efforts to address the use of programmable embedded COMSEC solutions and other cryptographic technology for replacement of aging and obsolete cryptos in Navy systems (e.g., Advanced Narrow-Band Digital Voice Terminal (ANDVT), VINSON, KG-84, KG-40 in support of Link-11, and the Thornton family in support of Link-16). Identify applications and technology for new ship construction and other platforms, as well as for new emerging communications backbones/circuits in support of Navy initiatives such as IT-21/NVI.
 - (U) (\$1,249) Continue development of EKMS Tier 1.
 - (U) (\$842) Complete development, integration and testing of the Tier 1 system with Tiers 0, 2 and 3 components and software.
 - (U) (\$4,802) Begin the development of EKMS Phase IV. This includes support for the support for the incorporation of the DMS in EKMS, development of requirements for Data Transfer Device (DTD) 2000, and for addressing incorporation of key management solutions for IT-21/NVI. Address the development and inclusion of web-based technology, integration of PKI/CMI technology, integration of key management and net planning capabilities and functions, and support for the incorporation of the Key Systems Operation

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(KSO) exchange. Additional efforts focus on the development of the Navy Single Point Command, Control and Keying (NSPC²K) design and solution for Navy platforms and support for embedded cryptographic technology and the Navy's crypto replacement efforts. Continue the development, evaluation and application assessment of high assurance products, and provide system security and C&A engineering and testing for key management components and systems.

- (U) (\$475) Begin the design, development, application and evaluation of PKI/CMI techniques (e.g., benign key), netted re-key technology, application of COTS key management technology, key/net management integration, key and certificate workstation integration, key fill device and delivery technology, new cryptographic algorithm developments, and new approaches to cryptographic technology (e.g., software, quantum cryptography, and chaos theory based). Provide the design, development, application and evaluation of new key generation and distribution techniques and technology. Conduct laboratory assessments of the latest NSA and industry COTS key management technology and products, and demonstrations of prototype key management systems.
- (U) (\$900) Begin development of the Navy Security Management Infrastructure (NSMI) architecture and design. This includes the development of the concept, architecture, and requirements for the integration of PKI/CMI components and technology for Navy applications and sites. Evaluate and assess the use and application of medium (and other) assurance commercial products for PKI/CMI applications. Assess the feasibility of integrated PKI/CMI technology with key management products and initiatives. Additional NSMI efforts shall focus on incorporating technology and techniques in support of the IT-21/NVI initiatives.
- (U) (\$2,576) Continue the design, development and assessment of security solutions/capabilities for next generation voice systems. Continue research into new secure voice technology, developing technology and techniques for secure voice over government and COTS communications backbones, specifically addressing wireline and wireless telephony applications and strategic and tactical communications. Support the integration of secure voice services in support of IT-21/ NVI. Develop/assess the requirements for integrated secure voice/data, and provide system security and C&A engineering and testing for secure voice components and systems. Continue the development of voice algorithms and security techniques, and conduct laboratory assessments of the latest NSA and industry COTS secure voice technology and products, and demonstrations of prototype secure voice systems. This includes development of secure voice technology to support Navy unique requirements/applications (e.g., point-to-multipoint) for new ship construction, existing ship platforms, and for shore sites.

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- (U) (\$200) Continue to research secure voice and biometric access consortia. Continued laboratory assessments of the latest NSA and industry INFOSEC technology and demonstrations of prototype voice systems. Continue research into new high assurance secure voice technology.
- (U) (\$620) Develop a security architecture for IA that includes virtually all Navy distributed information system development programs. Ensure the architecture evolves to provide proper protection as technology, DOD missions, and the threat all evolve. Provide inputs to the major Navy and joint initiatives that are defining and building distributed systems including IT-21, NVI, the Navy CIO Technology Infrastructure project, the Joint Technical Architecture, and large development programs including (Global Command and Control System, Maritime (GCCS-M), Global Command and Control System (GCCS), DMS, JMCMS and others. Include both defensive protections as well as intrusion monitoring in the architecture.
- (U) (\$2,692) Evaluate, test and if necessary, develop distributed information system security technology solutions for Navy information systems. This includes the examination and selection of various components, such as firewalls, intrusion detection systems, virtual private networking systems, public key based secure e-mail and web systems, and others as well as high assurance components for connection of Top Secret and SCI systems to lower level systems. Prototype some of the components at operational sites. Begin examining alternatives for high speed network encryption (IP packet encryption at speeds of at least 100 Mbps).
- (U) (\$1,950) Provide developmental systems security engineering, C&A support to Navy information system developments such as GCCS-M, GCCS, DMS, JMCMS, IT-21, NVI, NSSLN, LPD-17, SC-21, and others. Focus on integration of the proper functions to ensure adherence to the common security architectures. Ensure that the security and performance of the tactical systems, including those operating at Top Secret and at SCI are consistent with Navy and DOD requirements.
- (U) (\$705) Continue developing and updating INFOSEC standards and engineering guidance documents to ensure they are consistent with the security architecture, the rapidly changing technology, and the evolving threat. Include guidance for proper operational procedures for the use of the security protections at various levels in the command hierarchy.
- (U) (\$550) Develop, prototype, and test solutions to the coalition interoperability problem. Base the solutions on available multilevel security technologies as well as emerging architectural methods of providing interoperability across different security levels.

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BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0303140N

PROGRAM ELEMENT TITLE: Information Systems Security Program

- (U) (\$1332) Continue vulnerability/threat assessments and development and systems integration of network countermeasures tools (NVACM) efforts.
- 3. (U) FY 2000 PLAN:
 - (U) (\$2,000) Continue development of programmable embedded COMSEC solutions for the remainder of the KG-3X family of cryptos, addressing specifically the ground based transmitter sites and TACAMO aircraft. Begin the development and implementation of benign keying technology for all crypto replacement efforts. Continue efforts to address the use of other cryptographic technology for replacement of aging and obsolete cryptos in existing and new Navy communications systems/circuits (e.g., ANDVT, VINSON, KG-84, KG-40 in support of Link-11, and the Thornton family in support of Link-16). Continue to identify and target applications for cryptographic replacement technology for new ship construction and other platforms, as well as for new emerging communications backbones/circuits in support of Navy initiatives such as IT-21/NVI. Begin prototyping candidate cryptographic replacement solutions for evaluation and assessment in Navy representative circuits and platforms. These efforts will be coordinated with the NSA.
 - (U) (\$825) Complete development of EKMS, and ensure compatibility with the Tier 0, Tier 2, and Tier 3 components and software.
 - (U) (\$2,675) Continue the development of EKMS Phase IV for Tier 1, Tier 2 and Tier 3. This includes support for the incorporation of the DMS into EKMS, and for addressing incorporation of enhanced key management capabilities/solutions for IT-21/NVI. Address the development and inclusion of web-based technology and support for the incorporation of the KSO exchange. Begin the requirements definition for integration of certificate management and key management. Additional efforts focus on the development and prototyping of the NSPC²k design and solution for Navy platforms, development and prototyping of the DTD 2000, and key management support for embedded cryptographic technology and the Navy's crypto replacement efforts. Provide system security and C&A engineering and testing for key management components and systems.
 - (U) (\$1,260) Continue the design, development, application and evaluation of key management technology, key management techniques (e.g., benign key), netted re-key technology, application of COTS key management technology, key/net management integration, key and certificate workstation integration, key fill device and delivery technology, new cryptographic algorithm developments, and new approaches to cryptographic technology (e.g., software, quantum cryptography, and chaos theory based). Initiate

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PROGRAM ELEMENT TITLE: Information Systems Security Program

prototyping and demonstration of technology. Provide the design, development, application and evaluation of new key generation and distribution techniques and technology. Conduct laboratory assessments of the latest NSA and industry COTS key management technology and products, and demonstrations of prototype key management systems.

- (U) (\$1,125) Continue development of the NSMI architecture and design. Based on the Navy's architecture/concept and requirements, begin the evaluation, development and integration of PKI/CMI components and technology for Navy applications and sites. Additional NSMI efforts shall focus on incorporating SMI technology and techniques in support of the IT-21/NVI initiatives. Evaluate and assess the use and application of medium (and other) assurance commercial products for PKI/CMI applications. Continue assessing the feasibility of integrated PKI/CMI technology with key management products and initiatives. Work closely with the commercial developers and vendors, infuse technology and requirements into the commercial products, as required.
- (U) (\$2,110) Continue the design, development and assessment of security solutions/capabilities for next generation voice systems. Continue research into new secure voice technology, developing technology and techniques for secure voice over government and COTS communications backbones, specifically addressing wireline and wireless telephony applications and strategic and tactical communications. Support the integration of secure voice services in support of IT-21/NVI. Continue to develop and assess the technology for integrated secure voice/data, low data rate algorithms, voice compression technology in conjunction with cryptographic algorithm technology, and voice/speaker recognition. Continue the development of voice algorithms and security techniques, and conduct laboratory assessments of the latest NSA and industry COTS secure voice technology and products, and demonstrations of prototype secure voice systems. This includes development of secure voice technology to support Navy unique requirements/applications (e.g., point-to-multipoint) for new ship construction, existing ship platforms, and for shore sites, and for providing system security and C&A engineering and testing for secure voice components and systems.
- (U) (\$2,773) Initiate the design, development and assessment of the Secure Voice-21 (SV-21). This includes the development and integration of the crypto gateways (i.e., network interface card, crypto interface card, and the voice processing card), the crypto replacement technology based on PEIP, the SPC²K technology to support the embedded crypto replacements, and new voice algorithms (e.g., Mixed Excitation Linear Prediction (MELP)). This suite of equipment/solutions is targeted to support the LPD-17 class, the DDG-51 class, NSSN, and CVX class of ships by providing a secure voice solution for telephonic, tactical and secure voice problems, specifically addressing the IT-21 initiatives.

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- (U) (\$250) Continue to support secure voice and biometric access consortia. Continued laboratory assessments of the latest NSA and industry INFOSEC technology and demonstrations of prototype voice systems. Continued research into new high assurance secure voice technology.
- (U) (\$650) Continue the evolutionary development of security architectures for IA that include virtually all Navy distributed information system development programs. Ensure the architecture evolves to provide proper protection as technology, DOD missions, and the threat all evolve. Provide inputs to the major Navy and joint initiatives that are defining and building distributed systems including IT-21, NVI, the Navy CIO Technology Infrastructure project, the Joint Technical Architecture, and large development programs including GCCS-M, GCCS, DMS, JMCOMS and others. Include both defensive protections as well as intrusion monitoring in the architecture.
- (U) (\$3,860) Continue developing and testing distributed information system security solutions for Navy information systems. This includes the examination and selection of various components required by the architectures that may include firewalls, intrusion detection systems, virtual private networking systems, public key based secure e-mail and web systems, and others as well as high assurance components for connection of Top Secret and SCI systems to lower level systems. Prototype some of the components at operational sites.
- (U) (\$2,100) Provide systems security engineering, C&A support to Navy information system developments such as GCCS-M, GCCS, DMS, JMCOMS, IT-21, NVI, NSSL, LPD-17, SC-21, and others. Focus on integration of the proper functions to ensure adherence to the common security architectures. Ensure that the security and performance of the tactical systems, including those operating at Top Secret and at SCI are consistent with Navy and DOD requirements.
- (U) (\$825) Continue developing and updating INFOSEC standards and engineering guidance documents to ensure they are consistent with the security architecture, the rapidly changing technology, and the evolving threat.
- (U) (\$1,265) Develop, prototype, and test solutions to the coalition interoperability problem. Base the solutions on available multilevel security technologies as well as emerging architectural methods of providing interoperability across different security levels.

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PROGRAM ELEMENT: 0303140N

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- (U) (\$1,260) Continue vulnerability/threat assessments and development and systems integration of network countermeasures tools (NVACM) efforts.

B. (U) CHANGE SUMMARY EXPLANATION:

(U) Funding:

(U) FY 1998: -\$361K SBIR, \$2,120K is for pending below threshold reprogrammings, and -\$1,245K for DD1002: April 98 Update.

(U) FY 1999: -\$51K Revised Economic Assumption, -\$30K for Civilian Personnel Underexecution, and -\$1,040K CAAS adjustments and -\$77K for FFRDC Distribution.

(U) FY 2000: -\$1,660 reduction to finance other higher priority programs, \$300K for NWCf rates, -\$332K for Non-Pay Inflation, and \$92K for Civilian Pay Rates.

(U) Schedule: The schedule impact is directly related to the contractor's late start in portions of the software development effort and the additions of new requirements on the Tier 1 baseline contract.

(U) Technical: Tier 1 development contractor experienced unexpected delays in completing detail design or certain Tier 1 functions. New requirements were added to the present baseline Tier 1 Contract to maintain compatibility with NSA's Tier 0 design. These new requirements had a direct affect on the present software development resulting in re-work of current design and some new design work.

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands)

	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	TO COMPLETE PROGRAM	TOTAL
(U) OPN 3415 Information Systems Security Program (ISSP)	25,492	45,800	64,139	52,338	66,912	56,747	74,703	78,524	CONT.	CONT.

(U) O&MN 4A6M

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13,213	14,767	14,247	14,847	15,356	15,862	18,362	18,862	CONT.	CONT.
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(U) RELATED RDT&E:

(U) PE 0303140G (Cryptographic Equipments)

D. ACQUISITION STRATEGY

EXMS

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>To Complete</u>
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Program
Milestones

1Q-Tier 1 IOC

Engineering
Milestones

1Q-Build Rev 3

2Q-Build Review 1

3Q-Build Rev 2

3Q-Initial Phase IV

Development

T&E

Milestones

3Q-Tier 1 Test

1Q-Tier 1 Government Acceptance

Test (GAT)

Contract

Milestones

EIP

Program

Milestones

Engineering
Milestones

T&E

Milestones

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Contract
Milestones

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DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0303150N

PROGRAM ELEMENT TITLE: Global Command and Control System

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1998 ACTUAL ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE PROGRAM	TOTAL
X2304 Global Command and Control System (GCCS)	473	468	0	0	0	0	0	0	0	941
TOTAL	473	468	0	0	0	0	0	0	0	941

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Global Command and Control System (GCCS) is the DoD's conventional command and control (C2) system that supports the National Command Authority and the Joint Staff in the mission areas of force employment, sustainment, surveillance, reconnaissance and intelligence. Additionally, GCCS supports decision support systems at the Area Air Defense Coordinator (AADC) and Commander, Joint Task Force (CJTF) facilities.

The Defense Information Systems Agency (DISA) is the lead agency for GCCS, however, each Service is responsible for designing and developing essential Service-unique segments in support of their GCCS users. These segments must be interoperable with the GCCS architecture.

The Navy supported GCCS sites are USACOM, USPACOM, CINCLANTFLT, CINCPACFLT, CINCUSNAVEUR, CNO, and COMNAVCENT Bahrain (in FY00) and COMUSJAPAN, as well as associated remote and afloat users. The GCCS funding will transfer to the GCCS-M program beginning in FY2000.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT (BA 7) because it encompasses engineering and manufacturing development for upgrade of existing operational systems.

R-1 Shopping List - Item No 178-1 of 178-4

Exhibit R-2, RDT&E Budget Item Justification

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FY 2000 President's Budget Estimates

EXHIBIT R-2a, RDT&E,N Project Justification

DATE: February 1999

PROJECT NUMBER: X2304

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0303150N
 (U) COST (Dollars in thousands) PROGRAM ELEMENT TITLE: Global Command and Control System

PROJECT NUMBER & TITLE	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	TO	TOTAL
				ACTUAL ESTIMATE	ESTIMATE	ESTIMATE	ESTIMATE	ESTIMATE	COMPLETE	PROGRAM
X2304 Global Command and Control System (GCCS)	473	468	0	0	0	0	0	0	0	941

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Global Command and Control System (GCCS) is the DoD's conventional command and control (C2) system that supports the National Command Authority and the Joint Staff in the mission areas of force employment, sustainment, surveillance, reconnaissance and intelligence. Additionally, GCCS supports decision support systems at the Area Air Defense Coordinator (AADC) and Commander, Joint Task Force (CJTF) facilities.

The Defense Information Systems Agency (DISA) is the lead agency for GCCS, however, each Service is responsible for designing and developing essential Service-unique segments in support of their GCCS users. These segments must be interoperable with the GCCS architecture.

The Navy supported GCCS sites are USACOM, USPACOM, CINCLANTFLT, CINCPACFLT, CINCUSNAVEUR, CNO, and COMNAVCENT Bahrain (in FY00) and COMUSJAPAN, as well as associated remote and afloat users. The GCCS funding will transfer to the GCCS-M program beginning in FY2000.

R-1 Shopping List - Item No 178-2 of 178-4

Exhibit R-2a, RDT&E Project Justification

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FY 2000 President's Budget Estimates

EXHIBIT R-2a, RDT&E,N Project Justification

DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0303150N

PROJECT NUMBER: X2304

PROGRAM ELEMENT TITLE: Global Command and Control System

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1998 ACTUAL:

- (U) (\$465) Develop a Web based interface to the GCCS segments which will allow the use of standard Navy hardware instead of the non-standard hardware prescribed by DISA and migrate Navy site unique GCCS applications to GCCS DII version 4.0. Efforts will include initial development and required upgrades to accommodate changes between GCCS DII COE versions 3 and 4. The Navy site unique application, Reserve Data Unit Data Resource System version 4.0 (RUDRS), will also require updating to accommodate GCCS CDII version 4.0, developing new code to support emergent user requirements and migration to Oracle database.
- (U) (\$8) Develop and update Naval Command, Control, Communications, Computers, Intelligence, Sensors and Reconnaissance (C4ISR) implementation guidance. Develop and update Naval C4ISR mission to incorporate an overarching operational, systems, technical and information architectures. Conduct associated C4ISR analyses and studies.

2. (U) FY 1999 ESTIMATE:

- (U) (\$468) Continue to develop and migrate the Web based interfaces and Navy site unique GCCS applications to GCCS DII version 5.0. Efforts will include initial development and required upgrades to Navy segments to accommodate changes between GCCS DII COE versions 4 and 5. Develop RUDRS 5.0 and integrate with GCCS DII version 5.0.

3. (U) FY 2000 ESTIMATE: Not Applicable

4. (U) FY 2001 ESTIMATE: Not Applicable

R-1 Shopping List - Item No 178-3 of 178-4

Exhibit R-2a, RDT&E Budget Item Justification

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FY 2000 President's Budget Estimates

EXHIBIT R-2a, RDT&E,N Project Justification

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0303150N

PROJECT NUMBER: X2304

PROGRAM ELEMENT TITLE: Global Command and Control System

B. (U) PROGRAM CHANGE SUMMARY:

(U) CHANGE SUMMARY EXPLANATION:

FY 1998 reflects a \$6K decrease from DD1002: April 1998 update, and reflects a \$5K decrease for FY98 update.

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands)

	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	TO	TOTAL
(U) OPN 3350	1,781	2,932	0	0	0	0	0	0	0	4,713
(U) OMN	3,964	4,930	2,908	3,002	3,094	3,568	3,964	3,605	CONT.	CONT.

(U) RELATED RDT&E: Not applicable

D. (U) SCHEDULE PROFILE: Not Applicable

R-1 Shopping List - Item No 178-4 of 178-4

Exhibit R-2a, RDT&E Budget Item Justification

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FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0305160N
PROGRAM ELEMENT TITLE: Navy Meteorological and Oceanographic Sensors-Space (METOC)

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1998 ACTUAL	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R0524 Navy METOC Support (Space)	4,266	10,378	12,770	17,396	16,666	13,035	20,397	6,767	CONT.	CONT.
X1452 GEOSAT	344	1,236	1,737	1,731	967	953	973	993	CONT.	CONT.
TOTAL	4,610	11,614	14,507	19,127	17,633	13,988	21,370	7,760	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This program element supports Navy interests in meteorological and oceanographic (METOC) remote sensors. These interests include commitments to satellite, sensor, and operational development activities associated with three satellite programs: 1) the Joint Service Defense Meteorological Satellite Program (DMSP), 2) The National Polar-Orbiting Operational Environmental Satellite System (NPOESS) and 3) the Navy Geodetic/geophysical Satellite (GEOSAT), funded entirely by Navy. The passive microwave instruments carried on DMSP and future NPOESS provide global oceanic and atmospheric data of direct operational relevance, including sea surface wind, sea ice, precipitation; GEOSAT altimeter data are used to produce significant wave height, ocean circulation, and ocean topography. The Navy (METOC) Support Space provides for Navy participation in Navy/Air Force cooperative efforts leading to current and future DMSP sensor development, including calibration and validation of instruments and delivery of satellite products to the Fleet. A new initiative in 1997, Windsat, on the Coriolis spacecraft, is a partnered program to meet multiple Naval remote Sensing requirements and provide risk reduction effort for the Department of Commerce/National Oceanic and Atmospheric Administration /Department of Defense converged satellite program, National Polar-Orbiting Operational Environmental Satellite System (NPOESS). The Navy METOC Support (Space) project supports the Navy contribution to Windsat, which is fully funded via a formalized inter-agency agreement. The NPOESS Integrated Program Office is providing a portion of the funds for the Windsat sensor. The Air Force Space Test Program (STP) will pay for the satellite bus and the launch vehicle. The GEOSAT provided ocean

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Budget Item Justification
(Exhibit R-2, page 1 of 13)

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FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0305160N
PROGRAM ELEMENT TITLE: Navy Meteorological and Oceanographic Sensors-Space (METOC)

topography information from 1985-1990. In 1991, the Navy began the development of a follow-on capability to continue providing this required ocean topography information via the GEOSAT follow-on satellite, launched on 10 February 1998. Both of these projects fulfill Navy's obligation to develop Navy-unique, or mission critical technology.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it encompasses engineering and manufacturing development for upgrade of existing, operational systems.

B. (U) PROGRAM CHANGE SUMMARY FOR TOTAL PE:

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
(U) FY 1999 President's Budget:	4,753	11,671	13,739
(U) Appropriated Value:		11,671	-
(U) Adjustments from FY 1999 Presbudg:	-143	-57	+768
(U) FY 2000 President's Submission:	4,610	11,614	14,507

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 1998 adjustment is due to Small Business Innovation Research reduction (-130) and FY 1998 update (-13). FY 1999 adjustments due to revised economic assumptions (-27) and civilian personnel underexecution (-30). FY 2000 adjustments due to Navy METOC-SPACE realignment (+567), Navy Working Capital Fund (NWCF) (+315) and non pay inflation (-210).

R-1 Line Item 180

Budget Item Justification
(Exhibit R-2, page 2 of 13)

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FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0305160N
PROGRAM ELEMENT TITLE: Navy Meteorological and Oceanographic Sensors-Space (METOC)

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1998 ACTUAL	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R0524 Navy (METOC) Support (Space)	4,266	10,378	12,770	17,396	16,666	13,035	20,397	6,767	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Navy Meteorological and Oceanographic Sensor-Space (METOC)-Navy (METOC) Support (Space) project provides for Navy participation in current Defense Meteorological Satellite (DMSP) Special Sensor Microwave/Imager and Special Sensor Microwave Imager/Sounder, and future Navy unique sensor development efforts (Windsat) in support of the Fleet operational requirements. The project ensures Navy operational requirements are satisfied primarily through demonstration of technologies for inclusion on operational constellations such as DMSP and National Polar Orbiting Operational Environmental Satellite System (NPOESS). These reflect Navy unique efforts that are not funded within the Air Force DMSP/NPOESS program, and are in accordance with current inter-agency agreements. The project acquires information necessary to keep Navy ground receiving equipment compatible with future satellite data formats and data transfer rates. The project also provides for studies leading to operational improvements of satellite derived products and implemented via Navy participation as a voting member of the DMSP Configuration Control Board (CCB). Future funding plans respond to emerging Chief of Naval Office requirements for Navy METOC data. Plans for FY 2002 and beyond address the requirement for high-resolution

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Budget Item Justification
(Exhibit R-2, page 3 of 13)

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FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0305160N PROJECT NUMBER: R0524
PROGRAM ELEMENT TITLE: Navy Meteorological and Oceanographic PROJECT TITLE: Navy METOC
Sensors-Space (METOC) Support (Space)

METOC imagery to ships, in particular, in the data denied Indian Ocean area.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1998 ACOMPLISHMENTS:

- (U) (\$68) Participated in DMSP Special Sensor Microwave/Imager (SSM/I) Calibration/Validation. Continued data quality assurance activities in support of operational products.
- (U) (\$924) Conducted GEOSAT /follow-on launch and early orbit calibration/validation activities. Developed and updated Naval C4ISR mission to incorporate an overarching operational, systems, technical and information architecture. Conducted associated C4ISR analyses and studies.
- (U) (\$3,274) Completed preliminary design and analysis for Windsat and breadboard sensor and subsystems leading to a prototype instrument.

2. (U) FY 1999 PLAN:

- (U) (\$500) Conduct SSM/I calibration and validation. Prepare for validation effort associated with the expected launch of the first DMSP Special Sensor Microwave Imager/Sounder (SSM/I/S).
- (U) (\$1,401) Design and fabricate Airborne Polarimetric Microwave Imaging Radiometer (APMIR) to use for calibration/validation of DMSP SSM/I, and SSM/IS, and Windsat development, calibration, and validation.
- (U) (\$8,477) Continue Windsat sensor design and initiate fabrication of flight hardware. Support spacecraft design effort.

3. (U) FY 2000 PLAN:

- (U) (\$815) Continue to monitor SSM/I performance and prepare for validation effort associated with the expected launch of the first DMSP SSM/IS.
- (U) (\$612) Conduct field experiments with APMIR to use for calibration/validation of DMSP SSM/I and

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Budget Item Justification
(Exhibit R-2, page 4 of 13)

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FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0305160N PROJECT NUMBER: R0524
 PROGRAM ELEMENT TITLE: Navy Meteorological and Oceanographic PROJECT TITLE: Navy METOC
 Sensors-Space (METOC) Support (Space)

- SSM/IS sensors, and Windsat development, calibration, and validation.
- (U) (\$11,343) Complete final Windsat sensor design and continue fabrication of flight hardware. Prepare for Windsat calibration and validation.

B. (U) PROGRAM CHANGE SUMMARY: See total program change summary for P. E.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.
 (U) RELATED RDT&E:
 (U) PE 0305160F, Air Force DMSP
 (U) PE 0604218N, Air/Ocean Equipment Engineering

D. (U) SCHEDULE PROFILE: Not applicable.

A. (U) PROJECT COST BREAKDOWN: (\$ in thousands)

Project Cost Categories	FY 1998	FY 1999	FY 2000
a. Satellite Development	0	1,000	3,911
b. Payload Development	3,274	7,477	7,432
c. Science and Calibration/Validation	68	500	815
d. Airborne Testbed	0	1,401	612
e. Support GFO	924	0	0
Total	4,266	10,378	12,770

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Budget Item Justification
 (Exhibit R-2, page 5 of 13)

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FY 2000 RDT&E,N BUDGET PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0305160N PROJECT NUMBER: R0524
 PROGRAM ELEMENT TITLE: Defense Meteorological Satellite PROJECT TITLE: DMSp-Navy Support

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION (\$ in thousands)

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method Fund Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1997 & Prior	FY 1998 Budget	FY 1999 Budget	FY 2000 Budget	To Complete	Total Program
Product Development Misc.		N/A	CONT.	CONT.	727	3,274	8,477	11,343	CONT.	CONT.
Support and Management: Misc.		N/A	CONT.	CONT.	0	924	0	0	924	924
Test and Evaluation: Misc.		N/A	CONT.	CONT.	0	68	1,901	1,427	CONT.	CONT.

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Budget Item Justification
 (Exhibit R-3, page 6 of 13)

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FY 2000 RDT&E,N BUDGET PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1999
 BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0305160N PROJECT NUMBER: R0524
 PROGRAM ELEMENT TITLE: Defense Meteorological Satellite PROJECT TITLE: DMSP-Navy Support

TOTAL: 727 4,266 10,378 12,770 CONT. CONT.

GOVERNMENT FURNISHED PROPERTY: Not Applicable

	FY 1997 & Prior	FY 1998 Budget	FY 1999 Budget	FY 2000 Budget	To Complete	Total Program
Subtotal Product Development	727	4,266	10,378	12,770	CONT.	CONT.
Subtotal Support and Management:	0	0	0	0	0	0
Subtotal Test and Evaluation:	0	0	0	0	0	0
Total Project	727	4,266	10,378	12,770	CONT.	CONT.

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Budget Item Justification
 (Exhibit R-3, page 7 of 13)

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DATE: February 1999

FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0305160N
PROGRAM ELEMENT TITLE: Navy Meteorological And Ocean Sensors-Space (METOC)

(U) COST (Dollars in thousands)

PROJECT NUMBER & Title	FY 1998 ACTUAL	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 ESTIMATE	To Complete	Total Program
X1452 GEOSAT	344	1,236	1,737	1,731	967	953	973	993	CONT.	Cont.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project provides a satellite-borne radar altimeter sensor to obtain ocean topography measurements from which tactically significant features such as oceanfronts, eddies, and sea-ice edges are derived. Topography provides a unique and important data source in support of a number of Naval warfare areas such as anti-submarine and undersea warfare, as well as providing other agencies such as National Oceanic and Atmospheric Administration and National Aeronautics and Space Administration with valuable inputs to studies involving El Nino, global warming and climate change. Data was previously provided by GEOSAT from 1985 until the satellite failed in January 1990. The GEOSAT Follow-On (GFO) satellite is intended to provide interim altimetry data until altimetry data becomes available on a future environmental satellite.

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Budget Item Justification
(Exhibit R-2, page 8 of 13)

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FY 2000 RDT&E, N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT:

0305160N

PROJECT NUMBER: X1452

PROGRAM ELEMENT TITLE: Navy Meteorological and Ocean
Sensors-Space (METOC)

PROJECT TITLE: GEOSAT

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1998 ACCOMPLISHMENTS:

- (U) (\$337) Monitored launch operations, satellite performance and acceptance.
- (U) (\$7) Developed and updated Naval Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR) implementation guidance. Developed and updated Naval C4ISR mission to incorporate an overarching operational, systems, technical and information architecture. Conducted associated C4ISR analyses and studies.

2. (U) FY 1999 PLAN:

- (U) (\$800) Fund on-orbit performance incentive.
- (U) (\$436) Continue to monitor satellite performance. Conduct altimeter calibration/validation activities.

3. (U) FY 2000 PLAN:

- (U) (\$800) Fund on-orbit performance incentive.
- (U) (\$937) Continue to assess on-orbit system performance and conduct payload calibration and validation. Maintain ground segment hardware and software.

B. (U) Program Change Summary: See total program change summary for P.E.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E:

(U) PE 0604218N (Air/Ocean Equipment Engineering)

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Budget Item Justification
(Exhibit R-2, page 9 of 13)

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FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0305160N
PROGRAM ELEMENT TITLE: Navy Meteorological and Ocean
Sensors-Space (METOC)

PROJECT NUMBER: X1452
PROJECT TITLE: GEOSAT

D. (U) SCHEDULE PROFILE:

FY 1997 FY 1998 FY 1999 FY 2000

Launch Sat #1

FRR 3Q

On Orbit Tests

Program
Milestones

Engineering
Milestones

T&E
Milestones

Contract
Milestones Not Applicable

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Budget Item Justification
(Exhibit R-2, page 10 of 13)

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DATE: February 1999

FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

PROJECT NUMBER: X1452
PROJECT TITLE: GEOSAT

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0305160N
PROGRAM ELEMENT TITLE: Navy Meteorological and Ocean
Sensors-Space (METOC)

A. (U) PROJECT COST BREAKDOWN: (\$ in thousands)

Project Cost Categories	FY 1998	FY 1999	FY 2000
a. Satellite Development	344	1,236	1,737
b. Sensor Development	0	0	0
c. Contractor Engineering Support	0	0	0
Total	344	1,236	1,737

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION (\$ in thousands)

PERFORMING ORGANIZATIONS

Contractor/ Contract

R-1 Line Item 180

Budget Item Justification
(Exhibit R-3, page 11 of 13)

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FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1999

PROJECT NUMBER: X1452
PROJECT TITLE: GEOSAT

PROGRAM ELEMENT: 0305160N
PROGRAM ELEMENT TITLE: Navy Meteorological and Ocean
Sensors-Space (METOC)

BUDGET ACTIVITY: 7
PROGRAM ELEMENT TITLE: 0305160N

Government Performing Activity	Method Fund Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1997 & Prior	FY 1998 Budget	FY 1999 Budget	FY 2000 Budget	To Complete Program	Total
Product Development										
Ball Aerospace w/Options	CPIF	8/92	85,213	85,213	82,458	344	800	800	CONT.	CONT.
Various	Various	N/A	CONT.	CONT.	6,361	0	436	937	CONT.	CONT.
Support and Management:										
Contractor/ Government Performing Activity	Contract Method Fund Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1997 & Prior	FY 1998 Budget	FY 1999 Budget	FY 2000 Budget	To Complete Program	Total
Various					2,881	0	0	0	CONT.	CONT.
Test and Evaluation:										
GOVERNMENT FURNISHED PROPERTY Not Applicable										
Subtotal Product Development					82,458	344	1,236	1,737	CONT.	CONT.

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Budget Item Justification
(Exhibit R-3, page 12 of 13)

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FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0305160N PROJECT NUMBER: X1452
 PROGRAM ELEMENT TITLE: Navy Meteorological and Ocean PROJECT TITLE: GEOSAT
 Sensors-Space (METOC)

Subtotal Support and Management	2,881	0	0	0	CONT.	CONT.
Subtotal Test and Evaluation Not Applicable						
Total Project	85,339	344	1,236	1,737	CONT.	CONT.

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Budget Item Justification
 (Exhibit R-3, page 13 of 13)

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FY 2000 President's Budget Estimates
EXHIBIT R-2, FY 2000/2001 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305188N
PROGRAM ELEMENT TITLE: Joint (C4ISR) Battle Center

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1998 ACTUAL	FY 1999 ACTUAL	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE PROGRAM	TOTAL
X2456 Joint (C4ISR) Battle Center										
		5,337	8,125	8,303	8,497	8,704	8,897	9,095	CONT.	CONT.
TOTAL		5,337	8,125	8,303	8,497	8,704	8,897	9,095	CONT.	CONT.

Note: *Funds for this program were transferred from the Joint Staff to the Department of Navy, IAW Defense Reform Initiative, which moved JBC from CJCS to CINCUSACOM beginning in FY99. In addition, funds for this program were previously included in PE 0303149J-C4I for the Warrior.

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Joint Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR) Battle Center (JBC) is the Commander In Chief, United States Atlantic Command (CINCUSACOM) and Chairman, Joint Chiefs of Staff (CJCS) facility for warfighter exploration and assessment of C4ISR capabilities. The Center provides the combatant commands, at the Joint Task Force (JTF) level, with a near term joint assessment and experimental environment for the warfighter and technologist in support of Joint Vision 2010 (JV2010). It serves as the technical analysis and assessment agency for the Joint Requirement Operating Council (JROC) in determining C4ISR system "value-added" PRIOR to introduction to the CINCs and in advance of system fielding in operational environments. The intent is for the JBC to be a forcing function for joint synchronization and a means to foster rapid, near-term insertion of C4ISR technology. The mission of the JBC is to provide rapid assessment of required C4ISR interoperability and warfighter utility, join emerging C4ISR technology with new operational doctrine, and result in fielding C4ISR capabilities that meet the joint warfighter's needs.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it provides rapid assessment of required C4ISR interoperability, as well as rapid insertion of emerging technology, with new operational doctrine that will result in fielding C4ISR capabilities that meet the joint warfighter's need.

Program Budget Decision (PBD) 710, Defense Reform Initiative, moved the JBC from the Joint Staff to CINCUSACOM with funding moved to the Department of Navy, as Executive Agent for CINCUSACOM, effective FY 99. FY 97 and FY 98 funds are reflected in the Joint Staff RDT&E,DW budget submission.

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FY 2000 President's Budget Estimates
EXHIBIT R-2, FY 2000/2001 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305188N
PROGRAM ELEMENT TITLE: Joint (C4ISR) Battle Center

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1998 PLAN:

- (U) FY 98 funds are reflected in the Joint Staff RDT&E,DW budget submission.
- (U) Funds were transferred from PE 0303149J-C4I for the Warrior to PE 0305188-Joint C4ISR Battle Center beginning in FY 99

2. (U) FY 1999 PLAN:

- (\$705K) Host Joint Warfighter Interoperability Demonstration (JWID). The theme year JWID permits scenarios for warfighting commanders and acquisition decision makers which are relevant to new interoperability technology and the utility of evolving systems for operational use pertinent to each annual theme. The JBC has the infrastructure in place to support these demonstrations and the assessment methodology in place to support evaluations.
- (U) (\$1,450K) Follow-on JWID. Upon completion and evaluation of each theme year JWID the CINC's and CJTF's involved identify systems which demonstrated warfighting utility but which require further refinement and follow-on assessment. These technologies are forwarded to the JBC for inclusion in the exploitation fiscal year plan. Enhancements and follow-on assessments are conducted by JBC and programmatic recommendations are prepared.
- (U) (\$1,100K) Asynchronous Transfer Mode (ATM) Operational Demonstration. ATM will take advantage of significant advances in switching technology to ensure CJTF seamless communications across all forces. Bandwidth restrictions severely limit successful JTF operations. ATM offers a potential solution but there is currently no DOD or Industry standard. This effort addresses a lack of commonality among the services in their communications approaches and addresses synchronization disconnects relating to fielding schedules which affect the required CINC/JTF capability. Each service is currently selecting their "vendor of choice" which will likely lead to non-interoperability as well as increased cost and complexity in implementation. JBC will document/validate interoperability problems, assess ability to support tactical JTF down to actual ground forces and perform an operational demonstration.
- (U) (\$1,187K) Link 16 Operational Demonstration. Demonstrate Link-16/VMF Digitized Battle Space interoperability through proof of concept prototype development to permit portable exchange

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DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305188N
PROGRAM ELEMENT TITLE: Joint (C4ISR) Battle Center

of tactical information to/from Link-16 and VMF networks. This is an advanced concept technology demonstration (ACTD).

- (U) (\$895K) Federated Battle Lab (FBL). The FBL is a consortium of Joint and Service battle centers/laboratories formed to promote solutions to operational problems in CJTF environments. The JBC is recognized as the joint FBL hub by CINC's, services, agencies and CJTF's. The JBC, as chairman of the consortium, will coordinate efforts to capitalize on lessons learned in order to continue these effective and successful collaborative experiments in future years.

3. (U) FY 2000 PLAN:

- (U) (\$730K) Host Joint Warfighter Interoperability Demonstration (JWID). The theme year JWID permits scenarios for warfighting commanders and acquisition decision makers which are relevant to new interoperability technology and the utility of evolving systems for operational use pertinent to each annual theme. The JBC has the infrastructure in place to support these demonstrations and the assessment methodology in place to support evaluations.
- (U) (\$1,505K) Follow-on JWID. Upon completion and evaluation of each theme year JWID the CINC's and CJTF's involved identify systems which demonstrated warfighting utility but which require further refinement and follow-on assessment. These technologies are forwarded to the JBC for inclusion in the exploitation fiscal year plan. Enhancements and follow-on assessments are conducted by JBC and programmatic recommendations are prepared.
- (U) (\$1,112K) Federated Battle Lab (FBL). The FBL is a consortium of Joint and Service battle centers/laboratories formed to promote solutions to operational problems in CJTF environments. The JBC is recognized as the joint FBL hub by CINC's, services, agencies and CJTF's. The JBC, as chairman of the consortium, will coordinate efforts to capitalize on lessons learned in order to continue these effective and successful collaborative experiments in future years.
- (U) (\$1,390K) Intelligence, Surveillance and Reconnaissance (ISR). The JBC, as written into the Joint Intelligence Interoperability Board (JIIB), will perform system integration and functional assessments of the identified intelligence systems, including shared segments, as appropriate. JBC will establish and maintain a JTF Integration Facility (JTFIF) to include current and BETA baselines of all the major Service ISR systems to support on-going maturity, operational utility, and jointness assessments of ISR systems.

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BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305188N
PROGRAM ELEMENT TITLE: Joint (C4ISR) Battle Center

- (U) (\$1,251K) Information Assurance (IA). JBC will continue to be a key player in IA Tools integration with network management and for emerging network IA technologies. JBC will incorporate red-teaming into Joint exercises and PBL efforts in order to facilitate JBC assessments of new C4ISR IA technologies. JBC will also be looking at Information Operations Planning Tools that provide analysis, correlation, and fusion capabilities as well as greater visualization, rehearsal, and wargaming/situational analysis capabilities.
- (U) (\$681K) MILSATCOM. JBC will be a host site for the Global Broadcast System (GBS) Test Bed/GBS Receive Suite. Included in this effort will be the installation of a GBS receive suite at the JBC and the associated program plan to move the Phase I GBS Test Bed equipment to the JBC from the Pentagon. The JBC will be involved in joint evaluation of system applications for various MILSATCOM initiatives as they are developed, thereby assuring that they will be "born joint."
- (U) (\$1,456K) Joint C4ISR Operational Architectures. The focus of Joint Operational Architectures is on C4ISR support to the warfighter across the "Range of military operations." The objective is to describe the doctrinally based tasks and activities, operational elements, and the time phased information flows required to accomplish Joint military operations. The architectures will be used to assess and analyze doctrine, TTPs, system and procedural interoperability, processes, and synchronization issues that impact Joint Forces. These Operational Architectures will provide the baseline to identify warfighter requirements, design and structure assessments, and generate functional metrics. They will be developed and documented in close coordination with OSD, Joint staff, CINCS, and Services.

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Exhibit R-2, RDT&E Budget Item Justification

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EXHIBIT R-2, FY 2000/2001 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305188N
PROGRAM ELEMENT TITLE: Joint (C4ISR) Battle Center

B. (U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 1999: Economic Assumption (-\$12K), Civilian Personnel (-\$3K).
FY 2000: NWCF Rates (+\$32K), Civilian Pay Rates (+10K), and Non-Pay Inflation (-\$117K).

(U) Schedule: No change.

(U) Technical: No change.

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands)

	FY 1998	FY 1999	FY 2000
	ACTUAL	ACTUAL	ESTIMATE
(U) OPN 3368	*	2,677	0
(U) OMN 1C6C	*	10,071	12,456

Note: *Funds for this program were transferred from DISA to the Joint Staff in FY 97. Funds were further transferred from the Joint Staff to the Department of Navy, IAW Defense Reform Initiative, that moved JBC from CJCS to CINCUSACOM beginning in FY99. In addition, funds for this program were previously included in PE 0303149J-C4I for the Warrior.

(U) RELATED RDT&E: Not applicable

D. (U) ACQUISITION STRATEGY

- FY 1998-01. The JBC does not have a major contract for its RDT&E efforts. Equipments that are required to support our various projects are either bought from other service contracts and/or from the GSA schedule. Services are provided by other services and/or various vendors with expertise on a specific assessment we are accomplishing.

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FY 2000 President's Budget Estimates
EXHIBIT R-3, FY 2000/2001 RDT&E,N COST ANALYSIS

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305188N
PROGRAM ELEMENT TITLE: Joint (C4ISR) Battle Center

Exhibit R-3 Cost Analysis (page 1)										Date: February 1999				
APPROPRIATION/BUDGET ACTIVITY				1319/BA 7		PROGRAM ELEMENT: 0305188				PROJECT NAME AND NUMBER: JBC/x2456				
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY-99 Cost	FY-99 Award Date	FY-99 Var	FY-00 Cost	FY-00 Award Date	FY-00 Var	FY-01 Cost	FY-01 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Dev Support Equip Acquisition	MIPR	GSA Schedule		289	12/98		405	10/99				Cont	Cont	Cont
Systems Engineering	C-CPFF	ODU		40	12/98		56	10/99				Cont	Cont	Cont
Development T&E	MIPR	MITRE/ODU		167	12/98		235	10/99				Cont	Cont	Cont
Government Engineering Supt	WR	SPAWARENGC		39	3/99		57	10/99				Cont	Cont	Cont
Subtotal Product Development				535			753							
Remarks:														
Systems Engineering	C-CPFF	ODU		102	12/98		168	10/99				Cont	Cont	Cont
Contractor Engineering Supt	C-CPFF	GTE		432	12/98		630	10/99				Cont	Cont	Cont
Government Engineering Supt	WR	SPAWARENGC		829	3/99		1108	10/99				Cont	Cont	Cont
Misc	MIPR	Various		228	Var		346	Var				Cont	Cont	Cont
Subtotal Support				1591			2252					Cont	Cont	Cont
Remarks														

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Exhibit R-3, Project Cost Analysis

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FY 2000 President's Budget Estimates

EXHIBIT R-3, FY 2000/2001 RDT&E,N COST ANALYSIS

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305188N

PROGRAM ELEMENT TITLE: Joint (C4ISR) Battle Center

Exhibit R-3 Cost Analysis (page 2)												Date: February 1999	
APPROPRIATION/BUDGET ACTIVITY: 1319/BA 7				PROGRAM ELEMENT: 0305188				PROJECT NAME AND NUMBER: JBC/x2456					
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY-99 Cost	FY-99 Award Date	FY-00 Cost	FY-00 Award Date	FY-01 Cost	FY-01 Award Date	Cost To Complete	Total Cost	Target Value of Contract	
Dev Support Equipment Acq	MIPR	GSA Schedule		427	Var	802	Var			Cont	Cont	Cont	
Systems Engineering	C-CPFF	ODU		239	12/98	436	10/99			Cont	Cont	Cont	
Developmental T&E	MIPR	MITRE/IDA		704	12/98	1091	10/99			Cont	Cont	Cont	
Contractor Engineering Support	C-CPFF	GTE		143	4/99	298	10/99			Cont	Cont	Cont	
Gov Engineering Support	MIPR(s)	FBL Participants		1698	2/99	2493	10/99			Cont	Cont	Cont	
Subtotal T&E				3211		5120							
Remarks													
Subtotal Management													
Remarks													
Total Cost				5337		8125				Cont	Cont	Cont	
Remarks													

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Exhibit R-3, Project Cost Analysis

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FY 2000 President's Budget

DATE: February 1999

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0305204N**
PROGRAM ELEMENT TITLE: Tactical Unmanned Aerial Vehicles

(U) COST: (Dollars in Thousands)

<u>Project Number & Title</u>	<u>FY 1998 Budget</u>	<u>FY 1999 Budget</u>	<u>FY 2000 Estimate</u>	<u>FY 2001 Estimate</u>	<u>FY 2002 Estimate</u>	<u>FY 2003 Estimate</u>	<u>FY 2004 Estimate</u>	<u>FY 2005 Estimate</u>	<u>To Complete</u>	<u>Total Program</u>
A2467 VTOL UAV	*	0	38,489	43,407	49,129	19,731	0	0	0	150,756
A2478 Tactical Control Station	**	32,070***	24,553	15,724	9,481	9,441	9,641	9,848	CONT.	CONT.
A2479 Common Systems Development	**	9,027***	6,700	7,927	7,380	7,942	8,112	8,283	CONT.	CONT.
A2671 Multiple Participant Competitive Demonstration	*	9,977	0	0	0	0	0	0	0	9,977
TOTAL		51,074	69,742	67,058	65,990	337,114	17,753	18,131	CONT.	CONT.

* FY97 & FY98 funding received as a Congressional add; Program Element 0305204D (RDT&E, Defensewide)

** Funding included in Program Element 0305204D (RDT&E, Defensewide)

*** The FY99 Tactical Control Station (A2478) funding includes a Congressional Add of \$32,144 K for the Tactical Control Station (TCS) which is being executed under A2669. The FY99 Common Systems Development (A2479) funding includes a Congressional transfer from the Defense Airborne Reconnaissance Office (DARO) of \$5,048K executed under A2668 and a Congressional plus up of \$4,000K for the multi-function self aligned gate array technology which is being executed in project unit A2670.

(A) **MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:** This program provides for the development of tactical unmanned aerial vehicle (UAV) systems for DoD that provide warfighters with a dedicated capability for day/night aerial reconnaissance, surveillance and target acquisition (RSTA); intelligence, communications/data dissemination; electronic warfare; weather data collection to support combat operations; minefield detection; and nuclear, biological and chemical reconnaissance in limited adverse weather. Specifically:

- **VTOL UAV:** The Vertical Takeoff and Landing (VTOL) Unmanned Aerial Vehicle will provide users real-time and near-real-time data required to support intelligence surveillance and reconnaissance (ISR) efforts without the use of manned aircraft or reliance on limited joint theater or national assets. Missions supported under ISR and accomplished by a VTOL UAV include over-the-horizon classification and targeting, mine countermeasures, battle management chemical/biological agent reconnaissance and signals intelligence. The VTOL UAV would be an organic asset of the ship to which it is attached or deployed. The forte of the VTOL UAV is that it launches and recovers vertically and it can operate from any/all air capable ships as well as confined land based areas.

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- Other capabilities of the VTOL UAV include: autonomous waypoint navigation; automatic launch and recovery of the vehicle both ashore and afloat; incorporation of a heavy fuel engine and the ability to incorporate modular mission payloads. The data from the VTOL UAV System would be provided to the user through standard DoD Command, Control, Communications, Computers and Intelligence (C4I) systems, architectures and protocols.
- TCS: Efforts are underway to develop a Tactical Control System to provide an interoperable capability for the Medium Altitude Endurance (MAE) and the spectrum of present and future Tactical UAVs and their payloads utilized by the military for RSTA and combat assessment. TCS has the objective requirement to interface with the High Altitude Endurance (HAE) UAV systems and provide connectivity to service designated C4I systems. TCS is being developed in concert with the development of UAV concepts of operations so as to ensure system functionality satisfies operational requirements. TCS development and testing is being accomplished via a Government/Industry Team. Software integration/development is initially the responsibility of Naval Surface Warfare Center (NSWC), Dahlgren Division, while systems integration and hardware in the loop testing is being accomplished at the Joint Technology Center/System Integration Laboratory (JTC/SIL), Redstone Arsenal. The JTC/SIL allows the integration and simulation of air vehicles, payloads and system upgrades prior to actual flight. Integration of software and hardware within this controlled laboratory environment reduces the cost of test and evaluation and the risks associated with actual flight test. System Integration responsibility will migrate to industry in FY99 with the award of a system design, test and integration contract.
- CSD: Common Systems Development (CSD) provides for system interoperability and commonality among UAVs. Efforts such as payload development, joint logistics, simulation and modeling, UAV command and control antenna, and small UAV projects continue to ensure reduced life cycle costs, improved supportability, and the exploitation of technological advancement having UAV application.
- Multiple-Participant Competitive Demonstration: The Multiple-Participant Competitive Demonstration, known also as the VTOL Demonstration, provides the opportunity to assess the maturity of VTOL UAV technologies, evaluate air vehicle performance, minimize risks in development of VTOL UAVs in the Naval environment and gather lessons learned for future acquisition.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is categorized as Budget Activity 7 because it provides for development of technologies and capabilities in support of operational system development.

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FY 2000 President's Budget

DATE: February 1999

PROJECT NUMBER: A2467
PROJECT TITLE: VTOL UAV

PROGRAM ELEMENT: 0305204N
PROGRAM ELEMENT TITLE: Tactical Unmanned Aerial Vehicles

BUDGET ACTIVITY: 7

U) COST: (Dollars in Thousands)

<u>Project Number & Title</u>	<u>FY 1998 Budget</u>	<u>FY 1999 Budget</u>	<u>FY 2000 Estimate</u>	<u>FY 2001 Estimate</u>	<u>FY 2002 Estimate</u>	<u>FY 2003 Estimate</u>	<u>FY 2004 Estimate</u>	<u>FY 2005 Estimate</u>	<u>To Complete</u>	<u>Total Program</u>
A2467 VTOL UAV	*	0	38,489	43,407	49,129	19,731	0	0	0	150,736
TOTAL	*	0	38,489	43,407	49,129	19,731	0	0	0	150,736

* FY97 & FY98 funding received as a Congressional add; Program Element 0305204D (RDT&E, Defensewide)

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The VTOL UAV will provide users real-time and near-real-time data required to support ISR efforts without the use of manned aircraft or reliance on limited joint theater or national assets. Missions supported under ISR and accomplished by a VTOL UAV include over-the-horizon classification and targeting, mine countermeasures, battle management chemical/biological agent reconnaissance and signals intelligence. The VTOL UAV would be an organic asset of the ship to which it is attached or deployed. The forte of the VTOL UAV is that it launches and recovers vertically and it can operate from any/all air capable ships as well as confined land based areas. Other capabilities of the VTOL UAV include: autonomous waypoint navigation; automatic launch and recovery of the vehicle both ashore and afloat; incorporation of a heavy fuel engine and the ability to incorporate modular mission payloads. The data from the VTOL UAV System would be provided to the user through standard DoD Command, Control, Communications, Computers and Intelligence (C4I) systems, architectures and protocols. This program is categorized as Budget Activity 7 because it provides for development of technologies and capabilities in support of operational system development.

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FY 2000 President's Budget

DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0305204N

PROGRAM ELEMENT TITLE: Tactical Unmanned Aerial Vehicles

PROJECT NUMBER: A2467

PROJECT TITLE: VTOL UAV

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

Previous Accomplishments under Program Element 0305204D: FY97 and FY98 Congressional plus-up funds were provided to execute a VTOL UAV demonstration program with three contractors. The purpose of the demonstration program was to evaluate current VTOL UAV air vehicles which demonstrate the potential to meet or exceed defined performance objectives and to evaluate air vehicle technology risks associated with a VTOL UAV system operating in the Naval environment. The contracts for the demonstration program included 50 hours of flight test at a Government range, payload integration and demonstration and a life cycle cost estimate from the contractors. All three contractors concluded the initial phase of the demonstration. The demonstration program continues in FY99 with the integration of the UAV Common Automatic Recovery System (UCARS) in the VTOL UAV, shipboard demonstrations and integration with the Tactical Control System (TCS). FY99 efforts are described under Project Number A2671. Because of the success demonstrated by these three contractors at the government test site, it was determined that the technology was mature enough to proceed in acquiring a VTOL UAV platform.

1. FY 2000 Plan:

- (U) (\$27,180) Initiate system design efforts.
- (U) (\$ 7,944) Government support of UAV proposal evaluations leading up to MSII decision and competitive design evaluation.
- (U) (\$ 3,365) Funds miscellaneous efforts including technical management support and initial test efforts.

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FY 2000 President's Budget

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305204N

PROGRAM ELEMENT TITLE: Tactical Unmanned Aerial Vehicles

PROJECT NUMBER: A2467

PROJECT TITLE: VTOL UAV

(U) B. PROGRAM CHANGE SUMMARY

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
(U) FY 1999 President's Budget:	0	0	0
(U) Appropriated Value:			
(U) Adjustments from President's Budget:			+38,489
(U) FY2000/2001 President's Budget Submit			38,489

CHANGE SUMMARY EXPLANATION:

(U) Funding: The Navy funded the VTOL UAV program in POM 00 (FY00-\$15,343). PDM1 transferred funds from DARO (OSD) to the Navy (FY00-\$23,702). These increases were partially offset by a pricing adjustment of -\$556 thousand.

(U) Schedule: N/A

(U) Technical: N/A

(U) C. OTHER PROGRAM FUNDING SUMMARY: Not applicable.

<u>Appn</u> <u>WPN</u>	<u>FY 1998</u> <u>Budget</u>	<u>FY 1999</u> <u>Budget</u>	<u>FY 2000</u> <u>Estimate</u>	<u>FY 2001</u> <u>Estimate</u>	<u>FY 2002</u> <u>Estimate</u>	<u>FY 2003</u> <u>Estimate</u>	<u>FY 2004</u> <u>Estimate</u>	<u>FY 2005</u> <u>Estimate</u>	<u>To</u> <u>Complete</u>	<u>Total</u> <u>Program</u>
						\$40,256	\$57,061	\$63,904	Continuing	Continuing

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DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305204N

PROGRAM ELEMENT TITLE: Tactical Unmanned Aerial Vehicles

PROJECT NUMBER: A2467

PROJECT TITLE: VTOL UAV

(U) D. ACQUISITION STRATEGY: The VTOL UAV program will have a combined Milestone I/Milestone II decision in 2Q FY2000. Development, fabrication and developmental test of the VTOL UAV system is scheduled to begin in FY 2000 and continue through FY 2001/2002. A low rate initial production decision is planned for FY 2002 with operational testing being conducted in FY 2002. A Milestone III decision is planned for 2Q FY 2003 and the initial operational capability (IOC) would occur during 4Q FY 2003. Initial planning has a VTOL UAV system defined as: air vehicles (AVs), ground control stations (GCSs), modular mission payloads, remote data terminals, and spares. Connectivity into the DOD C4I architecture would be provided by the GCS, which is to be TCS compatible. Although not currently designated as a joint program, the VTOL UAV program can accommodate Joint Services (Army, Navy and Marine Corps) as well as U.S. Coast Guard requirements into the acquisition planning process. A key objective of the VTOL UAV program would be to minimize the Total Ownership Cost (TOC) of the system while providing the maximum utility to the user.

(U) E. SCHEDULE PROFILE

	FY 1998				FY 1999				FY 2000				FY 2001				FY2002				FY2003			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
(U) Program Milestones																								
Program Initiation, MSI/II																								
EMD																								
MSIII																								
IOC																								
(U) Contract Milestones																								
Competitive Design																								
Down select to EMD																								
(U) Engineering Milestones																								
CDR																								
PRR																								
(U) T&E Milestones																								
EOA																								
Developmental Testing																								
Operational Testing																								

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BUDGET ACTIVITY: 7
 PROGRAM ELEMENT: 0305204N
 PROGRAM ELEMENT TITLE: Tactical Unmanned Aerial Vehicles
 DATE: February 1999
 PROJECT NUMBER: A2467
 PROJECT TITLE: VTOL UAV

Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999		FY 2000		Total Cost	Target Value of Contract
			FY 1999 Cost	Award Date	FY 2000 Cost	Award Date		
<u>Cost Categories:</u>								
	<u>Project Development Organizations</u>							
	Design/Hardware Development	TBD			27,180	02/00	27,180	27,180
	Hardware Development	TBD			1,100	07/00	CONT.	CONT.
Development Support		WR			7,944	11/99	CONT.	CONT.
		NAWC-AD Patuxent River, MD						
Other					380		CONT.	CONT.
Subtotal Project Development					36,604		CONT.	CONT.

Remarks:

Support Organizations

Subtotal Support

Remarks:

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FY 2000 President's Budget

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305204N

PROJECT NUMBER: A2467

PROGRAM ELEMENT TITLE: Tactical Unmanned Aerial Vehicles

PROJECT TITLE: VTOL UAV

Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	Cost to Complete	Total Cost	Target Value of Contract
WR	NAWC-AD Patuxent River MD					CONT.	CONT.	CONT.
WR	OPTEVFOR Norfolk, VA			111	11/99	CONT.	CONT.	CONT.

Subtotal Test & Evaluation

111 CONT. CONT. CONT.

Remarks:

Management Organizations

Technical and Management Support
MISC.

FFP H. J. FORD
VARIOUS VARIOUS

1,100 10/99 CONT. CONT.
674 10/99 CONT. CONT.

Subtotal Management

1,774 CONT. CONT. CONT.

Remarks:

Total Cost

38,489

CONT. CONT. CONT.

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Exhibit R-3, RDT&E Project Cost Analysis
(Exhibit R-3, Page 8 of 28)

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305204N

PROJECT NUMBER: A2478

PROGRAM ELEMENT TITLE: Tactical Unmanned Aerial Vehicles

PROJECT TITLE: Tactical Control System

(U) COST: (Dollars in thousands)

<u>Project Number & Title</u>	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>To</u>	<u>Total</u>
	<u>Budget</u>	<u>Budget</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Complete</u>	<u>Program</u>
A2478 Tactical Control System	*	32,070**	24,553	15,724	9,481	9,441	9,641	9,848	CONT.	CONT.
TOTAL	*	32,070**	24,553	15,724	9,481	9,441	9,641	9,848	CONT.	CONT.

- * FY98 funding included in Program Element 0305204D (RDT&E Defense Wide)
- **FY99 funding includes \$32,144K as the result of a Congressional realignment from DARO. This funding is being executed in Project Unit A2669.

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

The Tactical Control System (TCS) provides interoperability and commonality for mission planning, command, control, communications, and data dissemination for the current and future family of Tactical and the Medium Altitude Endurance (MAE) Unmanned Aerial Vehicles (UAVs). It provides a full range of scaleable UAV capability from passive receipt of air vehicle and payload data to full air vehicle command and control. TCS functionality supports the joint warfighter with a common core operating environment to receive, process, and disseminate UAV air vehicle and payload data from two or more different UAV types for reconnaissance, surveillance, and combat assessment. TCS also has an objective requirement to receive and disseminate payload information from the Global Hawk and Dark Star endurance UAVs. TCS supports seamless integration into the existing Command, Control, Communications Computers and Intelligence (C4I) architecture and interfaces with other manned and unmanned reconnaissance platforms and intelligence systems thereby providing information superiority through cross cueing. TCS maximizes the use of Commercial and Government off-the-shelf (COTS and GOTS) hardware and software whenever possible. TCS software will be interoperable and operate on existing standard service computer platforms and compliant with the Assistant Secretary of Defense for Command, Control, Communications and Intelligence (ASD(C3I)) Joint Technical Architecture, Distributed Common Ground System (DCGS), Common Imagery Ground/Surface Station (CIGSS), and the United States Imagery Standards, and Defense Information Infrastructure/Common Operating Environment (DII/COE). The UAV Joint Technology Center and Systems Integration Laboratory (JTC/SIL) supports the assessment of system integration readiness prior to actual flight testing. The JTC/SIL provides for hardware-in-the-loop tests of payloads, air vehicles (A/V), ground system components, and joint interoperable interface and UAV Concept of Operations (CONOPS) evaluations using the Multiple UAV Simulation Environment (MUSE) in Advanced Warfighting Exercises (AWEs). The NATO Naval Armaments Group, Project 35, has undertaken studies/technical demonstrations to define a common interoperable NATO UAV ground control system architecture. Current plans include a TCS demonstration with a German UAV.

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0305204N**

PROJECT NUMBER: A2478

PROGRAM ELEMENT TITLE: Tactical Unmanned Aerial Vehicles

PROJECT TITLE: Tactical Control System

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. *FY 1998 ACCOMPLISHMENTS:

- (U) (\$8,373) Continued prototype demonstrations of land and sea-based TCS including mission planning, air vehicle, and payload control of MAE and TUAV.
- (U) (\$14,276) Continued TCS evolutionary development, engineering and integration efforts to include demonstration of scalability, portability, mission planning and C4I integration , and select a System Design, Test and Integration (SDTI) contractor.
- (U) (\$2,120) Continued documentation of system requirements.
- (U) (\$6,000) Continued JTC/SIL rapid prototyping simulation and modeling, systems integration and test including establishment of a development baseline.
- (U) (\$0,000) Continued participation in joint warfighting experiments and Service exercises for refinement of CONOPS. (Contingent on funding from Services).
- (U) (\$8,000) Acquired Predator AV and additional supporting assets for TCS integration and testing.
- (U) (\$ 900) Conducted flight route and payload planning system integration into TCS.
- (U) (\$1,000) Awarded SDTI contract.
- * FY98 funding included in Program Element 0305204D (RDT&E Defense Wide)

2. **FY 1999 PLAN:

- (U) (\$12,459) Mature and refine system design. Conduct critical design review and continue block 0 configuration development. Conduct Initial Operational Assessment.
- (U) (\$10,110) Transition system engineering responsibility to SDTI contractor. Perform validation of system manufacturing and production; complete documentation and logistics efforts. Deliver Engineering Development Units (EDUs).
- (U) (\$3,709) Continue route and payload planning systems integration, continue integration of CARS into TCS; and support interoperability tests (i.e. VTOL Technical Demonstration Phase II).
- (U) (\$5,000) Initiate Multiple UAV Simulation Environment (MUSE) efforts in support of TCS multi-UAV development.
- (U) (\$ 792) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

**FY99 funding includes \$32,144M as the result of a Congressional realignment from DARO. This funding is being executed in Project Unit A2669.

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305204N

PROGRAM ELEMENT TITLE: Tactical Unmanned Aerial Vehicles

PROJECT NUMBER: A2478

PROJECT TITLE: Tactical Control System

3. FY 2000 PLAN:

- (U) (\$6,100) Continue System Engineering and Configuration Management in support of service capable UAV ground control stations.
- (U) (\$4,700) Initiate TCS software pre-planned product improvements (P3I) to the C4I interfaces and re-programmable Data Control Modules.
- (U) (\$13,753) Continue Integration, Test and Certification of required C4I interfaces.

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305204N

PROJECT NUMBER: A2478

PROJECT TITLE: Tactical Control System

PROGRAM ELEMENT TITLE: Tactical Unmanned Aerial Vehicles

(U) B. PROGRAM CHANGE SUMMARY

(U) FY 1999 President's Budget:

FY 1998	FY 1999	FY 2000
0	0	0

(U) Appropriated Value:

32,144

(U) Adjustments from President's Budget:

+32,070 +24,553

(U) FY 2000/2001 President's Budget Submit:

0 32,070 24,553

FY 1998 funding (\$40.7M) included in Program Element 0305204D (RDT&E, Defensewide)

CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 1999 funding includes (\$32.1M) as the result of a Congressional realignment from DARO which was partially offset by a decrease of \$74 thousand for Congressional undistributed reductions. FY 00 funding includes \$24,553 which was transferred by PDM1 from DARO to the Navy. This increase was offset by a decrease of \$355 thousand for a pricing adjustment.

(U) Schedule: N/A

(U) Technical: N/A

(U) C. OTHER PROGRAM FUNDING SUMMARY: Not Applicable.

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0305204N

PROGRAM ELEMENT TITLE: Tactical Unmanned Aerial Vehicles

PROJECT NUMBER: A2478

PROJECT TITLE: Tactical Control System

(U) D. ACQUISITION STRATEGY:

The TCS initial design and development effort will be completed at the end of Program Definition and Risk Reduction phase (Phase I) in the 3Q of FY99; Engineering and Manufacturing Development (EMD) phase (Phase II) begins in 3Q FY99. A major effort during the EMD phase will be the integration of government furnished TCS hardware and software components by a Systems Design, Test and Integration (SDTI) contractor for four Engineering Development Units (EDUs). The SDTI contract was awarded to Raytheon Systems Company 1Q FY99. Options for Full Rate Production (Phase III) of additional TCS systems will be included in the basic SDTI contract. The TCS scheduled Initial Operational Capability (IOC) with the Air Force's Predator, MAE is 2Q FY01; Full Operational Capability (FOC) with the Air Force's Predator, MAE is 2Q FY02. IOC will be achieved after each service has fielded one TCS capable ground control system with interim Integrated Logistics Support (ILS) (training, spares, technical publications, support equipment) in place and testing (developmental and operational) completed. FOC will be achieved when full attainment of capability is provided by in-place maintenance and repair support, software support, test equipment and spares and systems are effectively employed and operated by the services' hosting unit or force.

(U) E. SCHEDULE PROFILE

	FY 1998				FY 1999				FY 2000				FY 2001			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
(U) Program Milestones																
MS II																
EMD Start																
EDU Delivery																
MS III (Air Force, Predator MAE)																
(U) Engineering Milestones																
SIL (System Integration / Test)																
MAE/TUAV Interoperability																

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0305204N**
PROGRAM ELEMENT TITLE: Tactical Unmanned Aerial Vehicles

PROJECT NUMBER: A2478
PROJECT TITLE: Tactical Control System

(U) E. SCHEDULE PROFILE Cont.

(U) T&E Milestones

TCS Capability for MAE/TUAV
 Receive Payload Data
 Mission Planning
 AV Payload Control
 Launch / Recovery
 C4I Integration
 Demos
 EDU

	FY 1998			FY 1999			FY 2000			FY 2001	
	1	2	3	4	1	2	3	4	1	2	3
X											
X		X									
X				X							
X		X		X							
X					X	X					
X											
X											
X											

(U) Contract Milestones
SDTI Award

X

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EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305204N

PROJECT NUMBER: A2478

PROGRAM ELEMENT TITLE: TACTICAL UNMANNED AERIAL VEHICLES

PROJECT TITLE: Tactical Control System

<u>Cost Categories:</u>	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999		FY 2000		Total Cost	Target Value of Contract
				Cost	Date	Cost	Date		
Primary Software/Hardware Development	WR	NSWC-DD Dahlgren, VA	*	9,940	10/98	5,302	10/99	CONT.	CONT.
Primary hardware Development	MIPR	JTC/SIL, Huntsville, AL	*	1,000	10/98			CONT.	CONT.
Development of the Predator Data Control Module	CPFF	GA-ASI, San Diego, CA	*	1,730	12/98				
Development of the Outrider Data Control Module	CPFF	Alliant Techsystems, Hopkins MN	*	536	12/98				
Systems Integration	CPAF	Raytheon, Falls Church, VA	*	5,000	12/98	8,540	12/99	CONT.	CONT.
Human Computer Interface Development	WR	NAWC-AD, Patuxent River, MD	*	240	10/98				
Subtotal Project Development				18,446		13,842		CONT.	CONT.
Remarks: Prior Years funded under PE 0305204D									
Support Organizations									
Configuration Management	WX,RC MIPR	NSWC-DD, Dahlgren, VA	*	813	10/98	630	10/99	CONT.	CONT.
Training/Logistics	WX,RC	Various	*	2,669	10/98	1,612	10/99	CONT.	CONT.
Other	MIPR	JTC/SIL Huntsville, AL	**	4,700	10/98				
Subtotal Support			*	8,182		2,242		CONT.	CONT.

Remarks:

* Prior years funded under PE 0305204D
 ** Congressional Adjustment for Multiple UAV Simulation Environment (MUSE) support.

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EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305204N

PROJECT NUMBER: A2478

PROGRAM ELEMENT TITLE: TACTICAL UNMANNED AERIAL VEHICLES

PROJECT TITLE: Tactical Control System

<u>Cost Categories:</u>	<u>Contract Method & Type</u>	<u>Performing Activity & Location</u>	<u>Total Prior Yrs Cost</u>	<u>FY 1999</u>		<u>FY 2000</u>		<u>Cost to Complete</u>	<u>Total Cost</u>	<u>Target Value of Contract</u>
				<u>Cost</u>	<u>Award Date</u>	<u>Cost</u>	<u>Award Date</u>			
<u>Test and Evaluation</u>										
Test Support	WX,RC	NSWC-DD, Dahlgren, VA	*	1,700	10/98	1,900	10/99	CONT.	CONT.	CONT.
Test Support	WX	NPS, Monterey, CA	*	1,362	10/98	1,250	10/99	CONT.	CONT.	CONT.
Miscellaneous	WR,RX, MIPR	Various	*			4,019	10/99	CONT.	CONT.	CONT.
Subtotal Test & Evaluation:			*	3,062		7,169		CONT.	CONT.	

Remarks:

* Prior year funding under PE 0305204D

Management Support

Miscellaneous	WX,RX MIPR	Various	*	1,588	10/98	1,300	10/99	CONT.	CONT.	CONT.
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Subtotal Management

SBIR Assessment

Remarks:.

* Prior year funding under PE 0305204D

Total Cost			*	32,070		24,553		CONT.	CONT.	
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FY 2000 PRESIDENT'S BUDGET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305204N

PROGRAM ELEMENT TITLE: Tactical Unmanned Aerial Vehicles

PROJECT NUMBER: A2479

PROJECT TITLE: Common Systems Development

U) COST: (Dollars in Thousands)

<u>Project Number & Title</u>	<u>FY 1998 Budget</u>	<u>FY 1999 Budget</u>	<u>FY 2000 Estimate</u>	<u>FY 2001 Estimate</u>	<u>FY 2002 Estimate</u>	<u>FY 2003 Estimate</u>	<u>FY 2004 Estimate</u>	<u>FY 2005 Estimate</u>	<u>To Complete</u>	<u>Total Program</u>
A2479 Common Systems Development	*	**9,027	6,700	7,927	7,380	7,942	8,112	8,283	CONT.	CONT.
TOTAL	*	**9,027	6,700	7,927	7,380	7,942	8,112	8,283	CONT.	CONT.

* FY98 funding included in Program Element 0305204D (RDT&E, Defensewide)

** FY99 funding includes \$5,048K as the result of a Congressional realignment from DARO. This is being executed in project unit A2668. In addition, FY99 includes a Congressional plus up of \$4,000K which will be executed in project unit A2670.

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Common Systems Development (CSD) pursues the RDT&E and production of systems common to the tactical family of Unmanned Aerial Vehicles (UAVs) (Pioneer, Outrider, Predator), including growth payloads and subsystems; performs user demonstrations of emerging UAV technologies; manages UAV joint international programs; and provides cross-functional support in the areas of logistics, simulation, test, and operations research. CSD supports testing, common system integration, and subsystems development for UAVs, including the UAV Common Automatic Recovery System (UCARS) and Modular Integrated Avionics Group (MIAG) and supports initiatives to reduce life cycle costs, improve supportability, and exploit commercial and Non Developmental Item (NDI) technology having UAV applications. CSD also provides user demonstration, integration, test, and qualification of Joint Requirements Oversight Council (JROC) -prioritized growth payloads such as communication/data relay, electronic warfare, laser designator, and chemical/biological reconnaissance; demonstrates alternative UAV technologies and concepts, including Vertical Take Off and Landing (VTOL) and Multifunction Self-Aligned Gate (MSAG) active array antennas; and provides small UAV capabilities in response to unique warfighter requirements. CSD's International program efforts include cooperative R&D arrangements with major NATO and non-NATO allies and providing day-to-day management and policy oversight regarding UAV export control and foreign military sales.

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Exhibit R-2a, Project Justification
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EXHIBIT R-2a, FY 2000 PRESIDENT'S RDT&E N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305204N

PROGRAM ELEMENT TITLE: Tactical Unmanned Aerial Vehicles

PROJECT NUMBER: A2479

PROJECT TITLE: Common Systems
Development

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

Previous Accomplishments under Program Element 0305204D: The previous CSD FY98 budget was used to conduct Congressionally-directed research of Multifunction Self-Aligned Gate (MSAG) active array antenna and to continue Congressionally directed flight demonstration of UAV VTOL technology, including initiation of Congressionally directed Stopped-Rotor/Reaction Drive/High Speed VTOL UAV Concept Technology Demonstrations.

1. FY 1999 Plan:

- (U) (\$1,752) Initiate and support integration, demonstration, and test of growth payloads
- (U) (\$200) Continue international initiatives to improve UAV integration into NATO Task Force Operations
- (U) (\$200) Continue exchange with allies to expand US markets and work cost-effective solutions to US requirements
- (U) (\$600) Improve/validate UCARS and MIAG upgrades to expand user base and enhance common applications
- (U) (\$200) Investigate alternative UAV automatic launch/recovery technologies
- (U) (\$500) Support small-drone demonstrations and special payload integration in response to user community requirements
- (U) (\$1,460) Continue common integration, test, logistics and international support efforts
- (U) (\$3,892) Conduct Congressionally-directed research of Multifunction Self-Aligned Gate (MSAG) active array antenna
- (U) (\$223) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638

2. FY 2000 Plan:

- (U) (\$2,900) Initiate and support integration, demonstration, and test of growth payloads
- (U) (\$1,200) Corrections of UCARS/MIAG deficiencies identified during initial fielding and user base expansion
- (U) (\$2,000) Support small UAV development and special payload integration in response to user community requirements
- (U) (\$600) Continue international initiatives to improve UAV integration into NATO Task Force Operations and common international support efforts

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EXHIBIT R-2a, FY 2000 PRESIDENT'S RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0305204N PROJECT NUMBER: A2479
PROGRAM ELEMENT TITLE: Tactical Unmanned Aerial Vehicles PROJECT TITLE: Common Systems Development

(U) B. PROGRAM CHANGE SUMMARY

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
(U) FY 1999 President's Budget:	0	0	0
(U) Appropriated Value:		9,048	
(U) Adjustments from President's Budget:		+9,027	+6,700
(U) FY 2000 President's Budget Submit:	0	9,027	6,700

CHANGE SUMMARY EXPLANATION:

FY 1998 funding (\$12.0M) included in Program Element 0305204D(RDT&E, Defensewide)

(U) Funding: FY 1999 funding includes \$5,048K as the result of the Congressional realignment from DARO and a Congressional increase of \$4,000K for MSAG. These increases were partially offset by a decrease of \$21K for Congressional undistributed reductions. FY00 funding transferred from DARO in the amount of \$6,797 as the result of PDM1. Pricing adjustments reduced funding in FY00 by \$97 thousand.

(U) Schedule: N/A
(U) Technical: N/A

(U) C. OTHER PROGRAM FUNDING SUMMARY: Not applicable.

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EXHIBIT R-2a, FY 2000 PRESIDENT'S RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305204N

PROGRAM ELEMENT TITLE: Tactical Unmanned Aerial Vehicles

PROJECT NUMBER: A2479

PROJECT TITLE: Common Systems Development

(U) D. ACQUISITION STRATEGY: The key objectives of this program element are to: maximize the potential for interoperability of UAVs among the services and among our international allies; minimize the growth payload impacts into multiple platforms; support the small UAV user; and continue international UAV initiatives. To maximize the interoperability of all UAVs, the UAV Common Automated Recovery System (UCARS) provides a recovery system for all operational platforms. CSD will field UCARS for the Pioneer UAV in FY 1999. FY 2000 and FY 2001 will require UCARS logistics support and Engineering Change Proposal (ECP) modifications. The Modular Integrated Avionics Group (MIAG), which provides a common avionics package across all operational platforms, will enter production in FY99. After initial MIAG fielding and user base expansion, the MIAG system must undergo a product improvement based on enhanced computer capabilities and future platform integration in both FY 2000 and FY 2001. Starting in FY 1999, CSD will support the development of a laser designator. In FY 2000, the laser designator will be integrated into a common payload for all tactical UAV use, to include VTOL. The laser designator technical demonstration will occur in FY 2001. If successful, the demonstration will allow an Initial Operational Capability (IOC) of the Laser designator in FY 2002/3. As in the past, CSD will continue to integrate, demonstrate and test advanced payload technologies as they emerge. New missions and operator requirements will be incorporated into all future payloads. For a potential fleet of small UAVs, CSD is identifying multi-service, small UAV requirements. In FY99, these requirements will be integrated into an Acquisition Strategy. In FY 2000 and FY 2001, CSD will execute this Acquisition Strategy. The CSD International Program Office (IPO) will continue initiatives to improve UAV integration into NATO Task Force Operations, including international VTOL and fixed wing UAV demonstrations. CSD IPO will pursue international sales of American UAV products. Foreign exchange of UAV technologies and developments are also continuing efforts.

(U) E. SCHEDULE PROFILE (CONT.)

FY1998				FY1999				FY2000			
1	2	3	4	1	2	3	4	1	2	3	4

T&E Milestones

Demo small-drone night vision sensor
NATO International VTOL Technology Demo

X

X

Contract Milestones

UCARS/MIAG Upgrade Award
MIAG Aircraft Integration Award
SMALL UAV Development Award

X

X

X

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Exhibit R-2a, Project Justification
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EXHIBIT R-3, FY 2000 PRESIDENT'S RDT&E,N COST ANALYSIS

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305204N

PROJECT NUMBER: A2479

PROGRAM ELEMENT TITLE: TACTICAL UNMANNED AERIAL VEHICLES

PROJECT TITLE: COMMON SYSTEMS DEVELOPMENT

<u>Cost Categories:</u>	<u>Contract Method & Type</u>	<u>Performing Activity & Location</u>	<u>Total Prior Yrs Cost</u>	<u>FY 1999</u>		<u>FY 2000</u>		<u>Cost to Complete</u>	<u>Total Cost</u>	<u>Target Value of Contract</u>
				<u>Cost</u>	<u>Award Date</u>	<u>Cost</u>	<u>Award Date</u>			
Primary Hardware Development	CPFF	TBD(LASER)		700	4/99	1,200	12/99	Cont.	Cont.	Cont.
	TBD	TBD(PAYLOAD)		288	4/99	750	3/00	Cont.	Cont.	Cont.
	TBD	TBD(SMALL UAV)		700	2/99	1,400	2/00	Cont.	Cont.	Cont.
	TBD	Other		800	2/98	800	4/00	Cont.	Cont.	Cont.
	TBD	ITT GILFALLON		3715	2/99					
Subtotal Product Development			0	6203		4,150		Cont.	Cont.	

Remarks:

Development Support	IQ/T&M(8A COMP)	H.J. FORD	974	12/98	1,050	12/99	Cont.	Cont.	Cont.
			627	12/98	500	12/99	Cont.	Cont.	Cont.

Subtotal Support			1,601		1,550		Cont.	Cont.	Cont.
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Remarks:

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EXHIBIT R-3, FY 2000 PRESIDENT'S RDT&E,N COST ANALYSIS

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305204N

PROGRAM ELEMENT TITLE: TACTICAL UNMANNED AERIAL VEHICLES

PROJECT NUMBER: A2479

PROJECT TITLE: COMMON SYSTEMS DEVELOPMENT

Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	Cost to Complete	Total Cost	Target Value of Contract
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Test and Evaluation

Misc.

1,000

1/99

1,000

12/99

Cont.

Cont.

Subtotal Test & Evaluation

0

1,000

1,000

Cont.

Cont.

Remarks:

Subtotal Management

SBIR Assessment

0

0

0

0

0

Remarks:

Total Cost

0

9,027

6,700

Cont.

Cont.

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Exhibit R-2a, RDT&E Project Justification
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FY 2000 PRESIDENT'S BUDGET

DATE: February 1999

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0305204N** **PROJECT NUMBER: A2671**
PROGRAM ELEMENT TITLE: Tactical Unmanned Aerial Vehicles **PROJECT TITLE: Multiple-Participant Competitive Demonstration**

U) COST: (Dollars in Thousands)

<u>Project Number & Title</u>	<u>FY 1998 Budget</u>	<u>FY 1999 Budget</u>	<u>FY 2000 Estimate</u>	<u>FY 2001 Estimate</u>	<u>FY 2002 Estimate</u>	<u>FY 2003 Estimate</u>	<u>FY 2004 Estimate</u>	<u>FY 2005 Estimate</u>	<u>To Complete</u>	<u>Total Program</u>
A2671 Multiple-Participant Competitive Demonstration	*	9,977	0	0	0	0	0	0	0	9,977
TOTAL	*	9,977	0	0	0	0	0	0	0	9,977

* FY97 & FY98 funding received as a Congressional add; Program Element 0305204D (RDT&E, Defensewide)

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Multiple-Participant Competitive Demonstration, known also as the VTOL Demonstration, provides the opportunity to assess the maturity of VTOL UAV technologies, evaluate air vehicle performance, minimize risks in development of VTOL UAVs in the Naval environment and gather lessons learned for future acquisition. This program is categorized as Budget Activity 7 because it provides for development of technologies and capabilities in support of operational system development.

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FY 2000 PRESIDENT'S BUDGET

DATE: February 1999

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT:** 0305204N

PROGRAM ELEMENT TITLE: Tactical Unmanned Aerial Vehicles

PROJECT NUMBER: A2671

PROJECT TITLE: Multiple-Participant

Competitive Demonstration

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

Previous Accomplishments under Program Element 0305204D: FY97 and FY98 Congressional plus-up funds were provided to execute a VTOL UAV demonstration program with three contractors. The purpose of the demonstration program was to evaluate current VTOL UAV air vehicles which demonstrate the potential to meet or exceed defined performance objectives and to evaluate air vehicle technology risks associated with a VTOL UAV system operating in the Naval environment. The contracts for the demonstration program included 50 hours of flight test at a Government range, payload integration and demonstration and a life cycle cost estimate from the contractors. All three contractors concluded the initial phase of the demonstration. The demonstration program continues in FY99 with the integration of the UAV Common Automatic Recovery System (UCARS) in the VTOL UAV, shipboard demonstrations and integration with the Tactical Control System (TCS).

1. FY 1999 Plan:

- (U) (\$3,400) Conduct land based UAV Common Automatic Recovery System (UCARS) efforts.
- (U) (\$6,331) Conduct shipboard demonstration efforts to include TCS integration efforts.
- (U) (\$246) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

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FY 2000 PRESIDENT'S BUDGET

DATE: February 1999

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0305204N**

PROJECT NUMBER: A2671

PROGRAM ELEMENT TITLE: Tactical Unmanned Aerial Vehicles

**PROJECT TITLE: Multiple-Participant
Competitive Demonstration**

(U) B. PROGRAM CHANGE SUMMARY

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
(U) FY 1999 President's Budget:	0	0	0
(U) Appropriated Value:		10,000	
(U) Adjustments from President's Budget:		\$9,977	
(U) FY2000 President's Budget Submit		\$9,977	

CHANGE SUMMARY EXPLANATION:

(U) Funding: FY99 funding includes \$10,000K as a result of a Congressional increase. This increase was partially offset by a decrease of \$23K for Congressional undistributed reductions.

(U) Schedule: N/A

(U) Technical: N/A

(U) C. OTHER PROGRAM FUNDING SUMMARY: Not applicable.

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FY 2000 PRESIDENT'S BUDGET

DATE: February 1999

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0305204N** **PROJECT NUMBER: A2467**
PROGRAM ELEMENT TITLE: Tactical Unmanned Aerial Vehicles **PROJECT TITLE: Multiple Participant Competitive Demonstration**

(U) D. ACQUISITION STRATEGY: The Multiple Participant Competitive Demonstration (VTOL UAV Demonstration) was designed as a program to evaluate current VTOL UAV air vehicles which demonstrate the potential to meet or exceed defined performance objectives and to evaluate air vehicle technology risks associated with a system operating in the Naval environment. This demonstration was congressionally directed and congressional plus-up funds were made available. A production representative VTOL UAV System would not be down-selected from the VTOL Demonstration contractors. Any acquisition program for a production VTOL UAV System would be the result of a free and open competition.

(U) E. SCHEDULE PROFILE

	<u>FY 1998</u>				<u>FY 1999</u>				<u>FY 2000</u>				<u>FY 2001</u>				<u>FY 2002</u>				<u>FY 2003</u>			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
(U) Program Milestones																								
Landbased UCARS				X																				
Ship Demo				X																				
(U) Contract Milestones																								
Option Exercise																								
(U) Engineering Milestones																								
Landing System Data								X																
Ship Install Data								X																
(U) T&E Milestones																								
Test Readiness Review (TRR)								X																
TCS Demo																								

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FY 2000 PRESIDENT'S BUDGET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305204N

PROJECT NUMBER: A2671

PROGRAM ELEMENT TITLE: Tactical Unmanned Aerial Vehicles

PROJECT TITLE: Mult. Part. Comp. Demo

<u>Cost Categories:</u>	<u>Contract Method & Type</u>	<u>Performing Activity & Location</u>	<u>Total Prior Yrs Cost</u>	<u>FY 1999</u>		<u>FY 2000</u>		<u>Total Cost</u>	<u>Target Value of Contract</u>
				<u>FY 1999 Cost</u>	<u>Award Date</u>	<u>FY 2000 Cost</u>	<u>Award Date</u>		
<u>Project Development Organizations</u>									
Project Integration	CPFF	Bell Helicopter	3788	3,302				3,302	7090
	CPFF	Bombardier	3740	2,952				2,952	6692
DEMO Support	WX	NAWC-AD Patuxent River,MD		1,320				1,320	
Ship Integration	PD	NAVSEA		1,000				1,000	

Subtotal Project Development

8,574

8,574

Support Organizations
Subtotal Support

Remarks:

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FY 2000 PRESIDENT'S BUDGET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305204N

PROJECT NUMBER: A671

PROGRAM ELEMENT TITLE: Tactical Unmanned Aerial Vehicles

PROJECT TITLE: Mult. Part. Comp. Demo

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999		FY 2000		Cost to Complete	Total Cost	Target Value of Contract
				FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date			

Test & Evaluation Organizations

Subtotal Test & Evaluation

Remarks:

Management Organizations

Technical and Management Support

MISC.

FFP	H. J. FORD	236	205				205		441
VARIOUS	VARIOUS		952				1,198		

Subtotal Management

SBIR Assessment

Remarks:

1,157							1,403		
246									

Total Cost

9,977							9,977		
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EXHIBIT R-2, FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305206N

PROGRAM ELEMENT TITLE: Airborne Reconnaissance Advanced Development (ARAD)

(U) COST: (Dollars in Thousands)

Project Number & Title	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete	Total Program
H2694 Advanced Digital Sensors	9,802*	3,048	2,986	6,921	7,920	8,848	18,165	22,994	CONT	CONT
R2476 Framing Reconnaissance Camera	9,278*	13,363	1,972	1,968	0	2,949	0	0	CONT	CONT
TOTAL	19,080*	16,411**	4,958	8,889	7,920	11,797	18,165	22,994	CONT	CONT

Quantity of RDT&E Articles

*Previously executed under Defense Airborne Reconnaissance Office (DARO) PE 0305206D8Z.

**FY 1999 funds executed under NAVAIR Project Unit H2675, ONR Project Unit R2676 and an ONR Project Unit yet to be determined for Framing Reconnaissance Camera effort. \$7,982 is to be executed through ONR and \$5,381 is to be executed through DARO

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This program funds and coordinates the development of advanced defense airborne reconnaissance technologies to ensure systems satisfy strategies and architectures to assure U.S. ability to support warfighter intelligence needs in the face of rapidly developing threat technology, proliferation of advanced weaponry, and uncertain political alignments. This program funds the development of the technologies that respond to evolving threats by emphasizing multi-service utility, interoperability among existing and planned complementary systems (i.e., sensors, ground systems, data links, and manned and unmanned platforms), and timely dissemination of intelligence information to operational forces. It also funds the architecture and master planning activities that will provide the overall guidance for airborne reconnaissance Signals Intelligence and Imagery Intelligence, and manned/unmanned airborne reconnaissance systems.

(U) JUSTIFICATION OF BUDGET ACTIVITY: This program is categorized as Budget Activity 7 because it provides for the development of technologies and capabilities in support of Operational Systems Development.

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Exhibit R-2, RDT&E Budget Item Justification
(Exhibit R-2, Page 1 of 15)

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305206N

PROGRAM ELEMENT TITLE: Airborne Reconnaissance Advanced Development (ARAD)

(U) COST: (Dollars in Thousands)

<u>Project Number & Title</u>	<u>FY 1998 Budget</u>	<u>FY 1999 Budget</u>	<u>FY 2000 Estimate</u>	<u>FY 2001 Estimate</u>	<u>FY 2002 Estimate</u>	<u>FY 2003 Estimate</u>	<u>FY 2004 Estimate</u>	<u>FY 2005 Estimate</u>	<u>To Complete</u>	<u>Total Program</u>
H2694 Advanced Digital Sensors	0*	3,048	2,986	6,921	7,920	8,848	18,165	22,994	CONT	CONT

Quantity of RDT&E Articles

*Previously executed under Defense Airborne Reconnaissance Office (DARO).
FY 1999 funds executed under NAVAIR Project Unit H2675.

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Provides funds for the development of sensor systems to improve present airborne reconnaissance capabilities. The developments are driven by evolving collection requirements and modern technology advances. The developments allow for the necessary changes required to meet an integrated, objective airborne reconnaissance architecture as defined in the Integrated Airborne Reconnaissance Strategy (IARS) and amplified in the Airborne Reconnaissance Information Technical Architecture (ARITA). The advanced sensor program includes technical analyses, systems engineering assessments, planning, and development for advanced airborne sensor systems. This effort focuses on developments which support sensor system interoperability and standardization of multi-Service and multi-platform applications. The advanced sensor developments will provide the technology transition modules for operational use necessary for the overall migration of the airborne fleet (manned and unmanned) to a Joint Airborne SIGINT Architecture (JASA) (i.e., sensors, ground systems, data links, and platforms), and provide the mechanism required for timely dissemination of intelligence information to operational forces. The development and modification of the lead integration aircraft (EP-3E) for the initial JASA modules will provide a mechanism to begin development and operational assessment of the Joint SIGINT Avionics Family (JSAF) components.

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305206N

PROGRAM ELEMENT TITLE: Airborne Reconnaissance

PROJECT NUMBER: H2694

PROJECT TITLE: Advanced Digital Sensors

Advanced Development (ARAD)

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1998 ACCOMPLISHMENTS:

(U) Previously executed under Defense Airborne Reconnaissance Office (DARO) PE 0305206D8Z.

2. FY 1999 PLAN:

(U) (\$2,973) Continue Story Series Development

- Complete joint Phase III Common Processor Core (CPC) development
 - Procure Story Book software integration lab/aircraft Tadpole replacement cards
 - Complete Story Finder software development
 - Complete Story Finder development unit
 - Begin requirements analysis for fusion integration
 - Continue Fusion Engine Software development
- (U) (\$ 75) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305206N

PROJECT NUMBER: H2694

PROGRAM ELEMENT TITLE: Airborne Reconnaissance

PROJECT TITLE: Advanced Digital Sensors

Advanced Development (ARAD)

3. FY 2000 PLAN:

(U) (\$2,986) Continue Story Series Development

- Begin Joint Common Processor Core (CPC) Phase IV Development
- Begin Story Finder Precision Direction Finding (DF) Array engineering development
- Complete requirements analysis for fusion integration
- Continue Fusion Engine Software development
- Begin Story Finder Integration within EP-3E aircraft
- Begin production of Story Finder Development Unit

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305206N

PROJECT NUMBER: H2694

PROGRAM ELEMENT TITLE: Airborne Reconnaissance

PROJECT TITLE: Advanced Digital Sensors

Advanced Development (ARAD)

(U) B. PROGRAM CHANGE SUMMARY

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
(U) FY 1999 President's Budget:	0*	0	0
(U) Appropriated Value:	0*	3,055	0
(U) Adjustments from Pres Budget:	0*	3,048	2,986
(U) FY 2000 President's Budget Submit:	0*	3,048	2,986

*Previously executed under Defense Airborne Reconnaissance Office (DARO) PE 0305206D8Z.
FY 1999 funds executed under NAVAIR Project Unit H2675.

CHANGE SUMMARY EXPLANATION:

(U) Funding: The net increase of \$3,048 in FY 1999 reflects a DARO transfer of \$3,055 thousand from PE 0305206D8Z and a Revised Economic Assumption adjustment of -\$7 thousand. The net increase of \$2,986 thousand in FY 2000 reflects a DARO transfer of \$3,000 thousand from PE 0305206D8Z and a Non Pay Inflation/Correction adjustment of -\$14 thousand.

(U) Schedule: Not Applicable.

(U) Technical: Not Applicable

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305206N

PROJECT NUMBER: H2694

PROGRAM ELEMENT TITLE: Airborne Reconnaissance

PROJECT TITLE: Advanced Digital Sensors

Advanced Development (ARAD)

(U) C. OTHER PROGRAM FUNDING SUMMARY

<u>APPN</u>	<u>FY 1998</u>	<u>Budget</u>	<u>FY 1999</u>	<u>Budget</u>	<u>FY 2000</u>	<u>Estimate</u>	<u>FY 2001</u>	<u>Estimate</u>	<u>FY 2002</u>	<u>Estimate</u>	<u>FY 2003</u>	<u>Estimate</u>	<u>FY 2004</u>	<u>Estimate</u>	<u>FY 2005</u>	<u>Estimate</u>	<u>To</u>
APN5 EP-3E OSIP 01-01							25,649		27,810		34,618		35,032		36,946		200,077

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0305206N PROJECT NUMBER: H2694
 PROGRAM ELEMENT TITLE: Airborne Reconnaissance PROJECT TITLE: Advanced Digital Sensors
 Advanced Development (ARAD)

Related RDT&E (Not applicable)

(U) D. ACQUISITION STRATEGY: Leverages/complements Air Force , Naval Research Laboratory, Office of Naval Research RDT&E efforts for technology insertions into EP-3E/ES-3/VPU productions programs.

(U) E. SCHEDULE PROFILE

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>TO COMPLETE</u>
(U) Program Milestones				2Q01/MSIII for StoryBook & Story Finder
(U) Engineering Milestones	2Q/Story Finder Review 4Q/Story Book CPC Review			1Q01/Begin megapixel microsensor dev
(U) T&E Milestones			2Q/DT/OA	3Q01/DT/OT

(U) Contract Milestones

FY98 Efforts accomplished under DARO PE 0305206D8Z

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EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305206N

PROJECT NUMBER: H2694

PROJECT TITLE: Advanced Digital Sensors

<u>Cost Categories:</u>	<u>Contract Method & Type</u>	<u>Performing Activity & Location</u>	<u>Total Prior Yrs Cost</u>	<u>FY 1999</u>		<u>FY 2000</u>		<u>Cost to Complete</u>	<u>Total Cost</u>	<u>Target Value of Contract</u>
				<u>Cost</u>	<u>Date</u>	<u>Cost</u>	<u>Date</u>			
Story Finder	CPFF	BTG, Vienna, VA; Sub-Melborne, FL		1050	1Q/99	900	1Q/00	CONT	CONT	CONT
CPC Development	CPFF	Raytheon, Greenville		856	1Q/99	650	1Q/00	CONT	CONT	CONT
Fusion Software Development		Various		245	1Q/99	325	1Q/00	CONT	CONT	CONT
Production Engineering (NRL)	Various	NRL						CONT	CONT	CONT
Subtotal Product Development				2,151		1,875		CONT	CONT	CONT
Remarks:										
System Engineering	WX	NAWC AD, Pax River, MD		247	1Q/99	316	1Q/00	CONT	CONT	CONT
System Engineering	CPFF	VARIOUS		275	1Q/99	292	1Q/00			
Systems Engineering	WX	NAWC WD, China Lake, CA		0		145				
Subtotal Support				522		753		CONT	CONT	CONT
Remarks:										

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EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305206N

PROJECT NUMBER: H2694

PROJECT TITLE: Advanced Digital Sensors

Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999		FY 2000		FY 2000 Award Date	Cost to Complete	Total Cost	Target Value of Contract
			Cost	Date	Cost	Date				
WX	NAWC AD, Pax River, MD				50		1Q/00			

Cost Categories:

Test and Evaluation

Subtotal Test & Evaluation

50 CONT CONT CONT

Remarks:

Technical Support

CPFF China Lake, CA 300 1Q/99 308 1Q/00 CONT CONT CONT

Subtotal Management

0 300 308 CONT CONT CONT

Remarks:

FY 1999 SBIR Assessment

Total Cost

0* 3,048 75 2,986 75 CONT CONT CONT

* PY funds executed under DARO PE#0305206D8Z

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305206N

PROJECT NUMBER: R2476

PROGRAM ELEMENT TITLE: Airborne Reconnaissance
Advanced Development (ARAD)PROJECT TITLE: Framing Reconnaissance
Camera

(U) COST: (Dollars in Thousands)

Project Number & Title	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete	Total Program
R2476 Framing Reconnaissance Camera	9,278*	13,363	1,972	1,968	0	2,949	0	0	CONT	CONT
TOTAL	9,278*	13,363	1,972	1,968	0	2,949	0	0	CONT	CONT

Quantity of RDT&E Articles

*Previously executed under Defense Airborne Reconnaissance Office (DARO) PE 0305206D8Z.
FY 1999 funds executed under ONR Project Unit R2676 (Electro Optical Congressional Add).

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: There are two primary objectives for the Advanced Technology funding: (1) to evaluate the utility and maturity of technology for airborne reconnaissance applications; and (2) to reduce the risk of employing emerging technologies in system upgrades, new system acquisitions, or Advanced Concept Technology Demonstrations (ACTDs), by integrating and exercising them in developmental and operational tests. These technologies help satisfy the requirements of the objective architecture set forth in the Integrated Airborne Reconnaissance Strategy (IARS). These technology investments are also identified in the Airborne Reconnaissance Technology Program Plan (ARTPP), published in November 1994. They were carefully selected from a broad range of technologies to provide utility to the warfighter at acceptable levels of cost and risk. This project continues technology transition programs in the critical areas identified in the ARTPP. This program leverages the commercial base at every opportunity while investing in carefully selected DoD-unique areas. Additionally, it defines near-term demonstrations in specific areas, followed by ones in which the most promising technology is chosen from a pool of possibilities currently under investigation within government and commercial sectors.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1998 ACCOMPLISHMENTS:

- (U) (\$3,000) Developed, tested and flown IR framing camera with FMC.
- (U) (\$5,000) Developed, tested and flown 100 Megapixel EO camera.
- (U) (\$1,000) Developed improved image data compression boards and initiated contract for next generation compression boards.
- (U) (\$ 278) Test flew fastest compression boards to date.

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305206N

PROJECT NUMBER: R2476

**PROGRAM ELEMENT TITLE: Airborne Reconnaissance
Advanced Development (ARAD)**

**PROJECT TITLE: Framing Reconnaissance
Camera**

2. FY 1999 PLAN:

- (U) (\$ 2,300) Continue development of 25-Megapixel/second IR framing camera.
- (U) (\$ 2,948) Begin multi-spectral medium altitude sensor development and transition MSI algorithms.
- (U) (\$ 7,785) Begin Electro-Optical development.
- (U) (\$ 330) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. FY 2000 PLAN:

- (U) (\$ 1,400) Continue multi-spectral medium altitude sensor development and development of IR framing camera.
- (U) (\$ 572) Develop and test precision strike capable camera.

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305206N

PROJECT NUMBER: R2476

**PROGRAM ELEMENT TITLE: Airborne Reconnaissance
Advanced Development (ARAD)**

**PROJECT TITLE: Framing Reconnaissance
Camera**

(U) B. PROGRAM CHANGE SUMMARY

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
(U) FY 1999 President's Budget:	0*	0	0
(U) Appropriated Value:	0*	13,393**	0
(U) Adjustments from Pres Budget:	9,278*	13,363**	1,972
(U) FY 2000/2001 President's Budget Submit:	9,728*	13,363**	1,972

* Previously executed under Defense Airborne Reconnaissance Office (DARO) PE 0305206D8Z.

** \$7,982 FY 1999 funds to be executed under ONR Project Unit R2676 and \$5,381 to be executed through DARO.

CHANGE SUMMARY EXPLANATION:

(U) Funding: The net increase of \$13,363 thousand includes \$5,381 thousand executed by DARO and +\$7,982 thousand executed by ONR. The \$7,982 increase reflects a +\$8,000 thousand Congressional Add for Electro Optical effort and a reduction of -\$18 thousand for a Revised Economic Assumption. The net increase of \$1,972 thousand in FY 2000 reflects a DARO transfer of \$2,000 thousand and a reduction of -\$28 thousand for Non pay inflation.

(U) Schedule: Not Applicable.

(U) Technical: Not Applicable.

(U) C. OTHER PROGRAM FUNDING SUMMARY

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>To</u>
<u>Appn</u>	<u>Budget</u>	<u>Budget</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Complete</u>

Related RDT&E

(U) F/A-18 SHARP (U) HISTAR

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305206N

PROJECT NUMBER: R2476

PROGRAM ELEMENT TITLE: Airborne Reconnaissance
Advanced Development (ARAD)

PROJECT TITLE: Framing Reconnaissance
Camera

(U) D. ACQUISITION STRATEGY: Leverages in-house (Navy RDT&E) efforts with commercial sources in the areas of advanced digital and sensor technology development.

(U) E. SCHEDULE PROFILE

TO COMPLETE

FY 2000

FY 1999

FY 1998

(U) Program Milestones

(U) Engineering Milestones

1Q/Begin Multi-Spec
IR Sensor Dev

3Q/Begin
Precision
Strike Dev

(U) T&E Milestones

2Q01/Precision
Strike Flight
Demo
3Q01/IR Camera
Flight Test

(U) Contract Milestones

FY98 and prior effort were budgeted and executed under DARO PE 0305206D8Z

**R-1 Item No. 185
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February 1999

DATE:

EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305206N

PROJECT NUMBER: R2476

PROJECT TITLE: Framing Reconnaissance Camera

<u>Cost Categories:</u>	<u>Contract Method & Type</u>	<u>Performing Activity & Location</u>	<u>Total Prior Yrs Cost</u>	<u>FY 1999 Cost</u>	<u>FY 1999 Award Date</u>	<u>FY 2000 Cost</u>	<u>FY 2000 Award Date</u>	<u>Cost to Complete</u>	<u>Total Cost</u>	<u>Target Value of Contract</u>
Production Engineering	CPFF	TBD Contractors	*	3,953	1Q/99	1,400	1Q/00	Cont	Cont	Cont
Technical Support	CPFF	TBD Contractors	*	1,277	1Q/99	572	1Q/00	Cont	Cont	Cont
Production Engineering	CPFF	TBD Contractors	0	7,803	2Q/99	0		Cont	Cont	Cont

Subtotal Product Development

0* 13,259 1,972

Cont

Remarks: * Funds executed as part of DARO PE# 0305206D8Z

Subtotal Support

0 0 0 0 0

0

Remarks:

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EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305206N

PROJECT NUMBER: R2476

PROJECT TITLE: Framing Reconnaissance Camera

Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999		FY 2000		Cost to Complete	Total Cost	Target Value of Contract
			Cost	Award Date	Cost	Award Date			
		0	0		0		0	0	0

Subtotal Test & Evaluation

Remarks:

Subtotal Management
Remarks:

FY 1999 SBIR Assessment

Total Cost

FY98 and prior effort executed under DARO PE 0305206D8Z

0* 330 13,363

1,972

330

Cont Cont Cont

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FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305207N

PROGRAM ELEMENT TITLE: Manned Reconnaissance Systems

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1998 ACTUAL	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
*R0117										
Reef Point		295	400	2,261	2,313	2,365	2,420	2,475	CONT.	CONT.
R2673										
FA 18F Tactical Reconnaissance (SHARP)		29,845	30,558	25,588	22,632	1,966	0	0	0	113,406
**2,817										
Total	3,144	30,140	30,958	27,849	24,945	4,331	2,420	2,475	CONT.	CONT.

*Executed at a higher level of classification--no project R2.

** Was executed under P.E. 0204136N in FY 1998.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Provides funds for the development of a podded dual-spectral-band reconnaissance camera system capable of being deployed on several tactical aircraft. The camera will have simultaneous visible and infrared imaging capability and provide digital images in national standard formats. The system will be capable of collecting imagery, recording on-board, and transmitting simultaneously to a ground receiving station. Cameras operating in multiple spectral bands will be introduced as the technology evolves. The target aircraft are the F/A-18E/F, Joint Strike Fighter (JSF), S-3, P-3, F-14, and F-16. A prototype system will be flight demonstrated by June 2001. Provision will be made to accommodate transmission of Search and Rescue (SAR) data. The system will operate autonomously from the aircraft operating software in order to be compatible with multiple aircraft. Emphasis will be placed on using commercially available subsystems and components in an open architecture so that evolutionary designs in cameras, processors, transmitters, and recorders can be introduced seamlessly via competitive procurement procedures. An aggressive development schedule will be embraced driving toward an operational capability by May 2003. The purpose of the aggressive development schedule is to have an operational capability ready to replace the F-14 Tactical Air Recce System (TARPS) due to retire beginning in 2003.

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Budget Item Justification
(Exhibit R-2, Page 1 of 8)

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FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305207N

PROGRAM ELEMENT TITLE: Manned Reconnaissance Systems

(U) This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it encompasses engineering and manufacturing development for upgrade of existing, operational systems.

(U) Program Change Summary for total P.E.

(U) FY 1999 President's Budget:	FY 1998	FY 1999	FY 2000
(U) Appropriated Value:	*3,245	342	405
(U) Adjustments from FY 1999 PRESBUDG:	-	30,342	-
(U) FY 2000 PRESBUDG Submission:	-101	+29,798	+30,553
	*3,144	30,140	30,958

*\$2,817 was executed under P.E. 0204136N in FY 1998.

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 1998 adjustment is due to SBIR assessment (-101). FY 1999 adjustments due to Congressional Undistributed Reductions (-202), and FY99 Congressional realignment of funds from F-18 (PE 0204136N) for Shared Reconnaissance Pod (+30,000). FY 2000 adjustments due to Civilian Pay Rates (+1), Non Pay Inflation (-448), and additional funds to continue development of SHARP (+31,000).

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

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Budget Item Justification
(Exhibit R-2, Page 2 of 8)

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FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305207N

PROGRAM ELEMENT TITLE: Manned Reconnaissance Systems

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1998 ACTUAL	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
32637 F/A 18E/F Tactical Reconnaissance (SHARP)										
	*2,817	29,845	30,558	25,588	22,632	1,966	0	0	0.	113,406

* Was executed under P.E. 0204136N in FY 1998.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Provides funds for the development of a podded dual-spectral-band reconnaissance camera system capable of being deployed on several tactical aircraft. The camera will have simultaneous visible and infrared imaging capability and provide digital images in national standard formats. The system will be capable of collecting imagery, recording on-board, and transmitting simultaneously to a ground receiving station. Cameras operating in multiple spectral bands will be introduced as the technology evolves. The target aircraft are the F/A-18E/F, Joint Strike Fighter (JSF), S-3, P-3, F-14, and F-16. A prototype system will be flight demonstrated by June 2001. Provision will be made to accommodate transmission of Search and Rescue (SAR) data. The system will operate autonomously from the aircraft operating software in order to be compatible with multiple aircraft. Emphasis will be placed on using commercially available subsystems and components in an open architecture so that evolutionary designs in cameras, processors, transmitters, and recorders can be introduced seamlessly via competitive procurement procedures. An aggressive development schedule will be embraced driving toward an operational capability by May 2003.

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Budget Item Justification
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FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305207N

PROGRAM ELEMENT TITLE: Manned Reconnaissance Systems

PROJECT NUMBER: R2673
PROJECT TITLE: F/A 18E/F
Tactical Reconnaissance

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1998 ACCOMPLISHMENTS:

- (U) (\$1,000) Solicit and evaluate industry input.
- (U) (\$1,817) Develop draft ORD and program plans.

2. (U) FY 1999 PLAN:

- (U) (\$14,000) Begin development of pod structure for multiple aircraft use.
- (U) (\$3,000) Risk reduction camera assessment, airborne vibration tests, dual band window development.
- (U) (\$4,500) Dual band camera development.
- (U) (\$4,000) Reconnaissance Management Systems (RMS) development.
- (U) (\$1,700) Begin systems software development.
- (U) (\$1,900) Begin subsystem and component procurement.
- (U) (\$745) Begin integration and testing.

3. (U) FY 2000 PLAN:

- (U) (\$600) Complete risk reduction efforts.
- (U) (\$2,500) Complete prototype integration and testing.
- (U) (\$900) Begin preparation for flight demonstration.
- (U) (\$3,000) Begin Integrated Logistics Support (ILS) program.
- (U) (\$4,200) Continue Software operational flight program.
- (U) (\$5,558) Procure Engineering, Development and Manufacturing (EDM) pods.
- (U) (\$8,800) Procure payloads.
- (U) (\$5,000) Continue Software development.

B. (U) PROGRAM CHANGE SUMMARY: See total program change summary for P.E.

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Budget Item Justification
(Exhibit R-2, Page 4 of 8)

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FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305207N

PROGRAM ELEMENT TITLE: Manned Reconnaissance Systems

PROJECT NUMBER: R2673
PROJECT TITLE: F/A 18E/F
Tactical Reconnaissance

C. (U) OTHER PROGRAM FUNDING SUMMARY:

(U) PROCUREMENT FUNDING: APN F-18E/F starting in FY 2001

(U) RELATED RDT&E:

(U) PE 0305206N (Airborne Reconnaissance Advance Development)

(U) PE 0204136N F/A-18

(U) PE 0305208N JSIPS

D. (U) SCHEDULE PROFILE:

(U) Program Milestones

FY 1998

FY 1999

FY 2000

MS II
EMD development

(U) Engineering Milestones

Pod structure CDR
Vibration Tests
Window Tests

(U) T&E Milestones

Reconnaissance
management system
delivery
Camera First system
flight tests flight tests

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Budget Item Justification
(Exhibit R-2, Page 5 of 8)

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FY 2000 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305207N

PROJECT NUMBER: R2673

PROGRAM ELEMENT TITLE: Manned Reconnaissance Systems

PROJECT TITLE: F/A 18

Tactical Reconnaissance

A. (U) PROJECT COST BREAKDOWN: (\$ in thousands)

Project Cost Categories

	FY 1998	FY 1999	FY 2000
a. Preliminary Design Review/Concept Review	2,817	0	0
b. SHARP pod structure	0	14,000	5,558
c. Dual band cameras	0	4,500	8,800
d. Subsystems components FFP	0	1,900	0
e. Risk reduction WX	0	3,000	600
f. Reconnaissance management	0	4,000	0
g. Software development	0	1,700	9,200
h. Integration and testing	0	745	3,400
i. Integrated Logistics Support	0	0	3,000
Total	2,817	29,845	30,558

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION (\$ in thousands)

PERFORMING ORGANIZATIONS

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Budget Item Justification
(Exhibit R-3, Page 6 of 8)

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FY 2000 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305207N

PROJECT NUMBER: R2673

PROGRAM ELEMENT TITLE: Manned Reconnaissance Systems

PROJECT TITLE: F/A 18

Tactical Reconnaissance

Contractor/ Government Performing Activity	Contract Method Fund Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1998 & Prior	FY 1999 Budget	FY 2000 Budget	To Complete	Total Program
Product Development									
Raytheon	IDIQ	Mar 99	14,000	14,000	0	14,000	5,558	12,986	32,544
TBD	CPFF	Mar 99	4,500	4,500	0	4,500	8,800	18,188	31,488
TBD	FFP	Jun 99	1,900	1,900	0	1,900	0	2,000	3,900
Miscellaneous	WX	Various	N/A	N/A	2,074	8,700	12,800	9,400	32,974
Various	Various	Various	Various	Various	743	0	0	0	743
Support and Management: Not Applicable Test and Evaluation:									
Miscellaneous	WX	Oct 99	N/A	N/A	0	745	3,400	7,612	11,757
TOTAL:					*2,817	29,845	30,558	50,186	113,406

GOVERNMENT FURNISHED PROPERTY: Not Applicable

FY 1998 & Prior	FY 1999 Budget	FY 2000 Budget	To Complete	Total Program
*2,817	29,100	27,158	42,574	101,649
Subtotal Product Development				

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Budget Item Justification
(Exhibit R-3, Page 7 of 8)

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FY 2000 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305207N

PROJECT NUMBER: R2673

PROGRAM ELEMENT TITLE: Manned Reconnaissance Systems

PROJECT TITLE: F/A 18

Tactical Reconnaissance

Subtotal Support and Management:	0	0	0	0	0
Subtotal Test and Evaluation:	0	745	3,400	7,612	11,757
Total Project	0	29,845	30,558	50,186	113,406

*Was executed under P.E. 0204136N in FY 1998.

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Budget Item Justification
(Exhibit R-3, Page 8 of 8)

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EXHIBIT R-2, FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 2

PROGRAM ELEMENT: 0305208N

PROGRAM ELEMENT TITLE: DISTRIBUTED COMMON GROUND SYSTEMS (DCGS)

(U) COST: (Dollars in Thousands)

Project Number & Title	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Complete	To Program
A2174 JSIPS-N	Budget	Budget	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Continuing	Continuing
	*	\$4,955**	\$5,583	\$6,042	\$6,049	\$6,608	\$6,694	\$6,794	Continuing	Continuing
TOTAL	*	\$4,955**	\$5,583	\$6,042	\$6,049	\$6,608	\$6,694	\$6,794	Continuing	Continuing

* FY 1998 funded under RDT&E Defense Wide, P.E. 0305208D8Z, Project P813, Common Imagery Ground/Surface Systems (CIGSS)

** FY 1999 budget reflects a transfer of funds from defense-wide account to Navy of \$4,966 for Common Imagery Ground/Surface Systems (A2677)

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

The Joint Services Imagery Processing System - The DCGS is a cooperative effort between the services, agencies, and DoD to provide systems capable of receiving, processing, exploiting, and disseminating data from airborne and national reconnaissance platforms. DCGS is further subdivided into systems which process, exploit, and disseminate Measurements Analysis and Signatures Intelligence (MASINT) data, Signals Intelligence (SIGINT) data, Multi-Intelligence Reconnaissance data, and Imagery data. Cooperative imagery processing systems are collected under the general heading Common Imagery Ground/Surface Systems (CIGSS). JSIPS-N is the Navy CIGSS component.

JSIPS-N has the capability to receive, process, exploit, store and disseminate imagery, imagery-derived products and imagery intelligence (IMINT) reports based on multi-source from multiple inputs. The primary mission of JSIPS-N is to assist strike planners, tactical aviators, and Marine Corps amphibious planners in the delivery of precision ordnance (including Tomahawk Cruise Missiles) on target.

JSIPS-N includes three major components, the Softcopy Exploitation Segment (SES) consisting of the Digital Imagery Workstation Suite Afloat (DIWSA) and the Precision Targeting Workstation (PTW), the National Input Segment (NIS) and the Tactical Input Segment (TIS). JSIPS-N is being installed onboard aircraft carriers (CV/CVN), amphibious assault ships (LHA/LHD), select fleet flag ships (AGF/LCC) and shore sites.

Secondary missions of the system are to provide near-real-time imagery and support to fleet intelligence assets, Special Operations Forces, and to support primary exploitation and dissemination of tactical organic and theater IMINT products.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it encompasses engineering and manufacturing development for upgrade of existing operational systems

EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

R-1 Item No. 187

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DATE: February 1999

BUDGET ACTIVITY: 2

PROGRAM ELEMENT: 0305208N

PROGRAM ELEMENT TITLE: DISTRIBUTED COMMON GROUND
SYSTEMS (DCGS)

PROJECT NUMBER: A2174

PROJECT TITLE: JOINT SERVICE IMAGERY
PROCESSING SYSTEMS

(U) COST: (Dollars in Thousands)

Project Number & Title	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete	Total Program Continuing
A2174 JSIPS-N	*	\$4,955**	\$5,583	\$6,042	\$6,049	\$6,608	\$6,694	\$6,794	Continuing	Continuing
TOTAL	*	\$4,955**	\$5,583	\$6,042	\$6,049	\$6,608	\$6,694	\$6,794	Continuing	Continuing

* FY 1998 funded under RDT&E Defense Wide, P.E. 0305208DBZ, Project P813, Common Imagery Ground/Surface Systems (CIGSS)

** FY 1999 budget reflects a Congressional Add of \$4,966 for Common Imagery Ground/Surface Systems (A2677)

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

The Joint Services Imagery Processing System – Navy (JSIPS-N) is the Navy's portion of the Distributed Common Ground System (DCGS) which is a cooperative effort between the services, agencies, and DoD to provide systems capable of receiving, processing, exploiting, and disseminating data from airborne and national reconnaissance platforms. DCGS is further subdivided into systems which process, exploit, and disseminate Measurements Analysis and Signatures Intelligence (MASINT) data, Signals Intelligence (SIGINT) data, Multi-Intelligence Reconnaissance data, and Imagery data. Cooperative imagery processing systems are collected under the general heading Common Imagery Ground/Surface Systems (CIGSS). JSIPS-N is the Navy CIGSS component.

JSIPS-N has the capability to receive, process, exploit, store and disseminate imagery, imagery-derived products and imagery intelligence (IMINT) reports based on multi-source from multiple inputs. The primary mission of JSIPS-N is to assist strike planners, tactical aviators, and Marine Corps amphibious planners in the delivery of precision ordnance (including Tomahawk Cruise Missiles) on target.

JSIPS-N includes three major components, the Softcopy Exploitation Segment (SES) consisting of the Digital Imagery Workstation Suite Afloat (DIWSA) and the Precision Targeting Workstation (PTW), the National Input Segment (NIS) and the Tactical Input Segment (TIS). JSIPS-N is being installed onboard aircraft carriers (CV/CVN), amphibious assault ships (LHA/LHD), select fleet flag ships (AGF/LCC) and shore sites.

Secondary missions of the system are to provide near-real-time imagery and support to fleet intelligence assets, Special Operations Forces, and to support primary exploitation and dissemination of tactical organic and theater IMINT products.

R-1 Item No. 187
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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 2

PROGRAM ELEMENT: 0305208N

PROJECT NUMBER: A2174

**PROGRAM ELEMENT TITLE: DISTRIBUTED COMMON GROUND
SYSTEMS (DCGS)**

**PROJECT TITLE: JOINT SERVICE IMAGERY
PROCESSING SYSTEMS**

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1998 ACCOMPLISHMENTS:

FY 1998 was funded as part of the RDT&E Defense-Wide Program, Distributed Common Ground Systems (DCGS), PE 0305208D8Z.

2. (U) FY 1999 PLAN:

- (\$4,232) JSIPS-N System Engineering including Precision Targeting Workstation, Classified Communications, JSIPS-N Concentrator Architecture and Imagery Exploitation Software Segment.
- (\$500) Perform Collaborative Contingency Targeting and Precision Guided Missile/Support Activity efforts.
- (\$100) Test and Evaluation Support.
- (\$123) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. (U) FY 2000 PLAN:

- (\$3,800) JSIPS-N System Engineering including Precision Targeting Workstation, Classified Communications, JSIPS-N Concentrator Architecture and Imagery Exploitation Software Segment.
- (\$919) Shared Reconnaissance Pod (SHARP)/Tactical Input Segment (TIS) Systems Engineering and Integration.
- (\$764) Perform Collaborative Contingency Targeting and Precision Guided Missile/Support Activity efforts.
- (\$100) Test and Evaluation Support.

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 2 PROGRAM ELEMENT: 0305208N PROJECT NUMBER: A2174
 PROGRAM ELEMENT TITLE: DISTRIBUTED COMMON GROUND PROJECT TITLE: JOINT SERVICE IMAGERY
 SYSTEMS (DCGS) PROCESSING SYSTEMS

(U) B. PROGRAM CHANGE SUMMARY

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
(U) FY 1999 President's Budget:	0*	0	0
(U) Appropriated Value:		\$4,966	
(U) Adjustments from President's Budget:	0*	+\$4,955	+\$5,583
(U) FY2000 President's Budget Submit:	0*	\$4,955	\$5,583

*FY 1998 budget for this item was submitted as part of the RDT&E Defense-Wide Program, Distributed Common Ground Systems (DCGS), PE 0305208D8Z. OSD Program Decision Memorandum, of 18 August 1998, transferred FY00-05 funding for this program to the services.

CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 1999 net increase of +\$4,955 thousand reflects a transfer from defense-side account to Navy of +\$4,966 thousand for Common Imagery Ground/Surface System and a decrease of -\$11 thousand for Congressional undistributed reductions. FY 2000 net increase of +\$5,583 thousand consists of an increase of +\$4,664 thousand DARO funding transfer and +\$1,000 thousand for IPDM reduction; and a decrease of -\$81 thousand for non pay inflation.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 2

PROGRAM ELEMENT: 0305208N

PROJECT NUMBER: A2174

PROGRAM ELEMENT TITLE: DISTRIBUTED COMMON GROUND
SYSTEMS (DCGS)

PROJECT TITLE: JOINT SERVICE IMAGERY
PROCESSING SYSTEMS

(U) C. OTHER PROGRAM FUNDING SUMMARY (Dollars in Thousands)

Appn OPN	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Total	
									Complete	Program Continuing
	*	\$65,556	\$41,255	\$47,791	\$46,556	\$45,404	\$73,975	75,079		

* FY 1998 procurement budget for this item was submitted in the Procurement, Defense-Wide appropriation as Distributed Common Ground Systems (DCGS), PE 0305208D8Z. OSD Program Decision Memorandum, of 18 August 1998, transferred FY00-05 funding for this program to the services.

Related RDT&E

Not applicable.

(U) D. ACQUISITION STRATEGY:

The production system consists of three elements, the Softcopy Exploitation System (SES) consisting of the Digital Imagery Workstation Suite Afloat (DIWSA) and the Precision Targeting Workstation (PTW), the National Input Segment (NIS) and Tactical Input Segment (TIS). The DIWSA is already in full rate co-production with other programs, most notably Tomahawk's mission planning systems. The NIS is also in full rate production and supplied as Government Furnished Equipment (GFE) by the National Imagery and Mapping Agency (NIMA SDD). The TIS is acquired from the Air Force Electronic Systems Center (ESC) at Hanscom AFB and is supplied as GFE to the integrating contractor. The system integrator for the Navy system is the Space and Naval Warfare Systems Command.

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 2

PROGRAM ELEMENT: 0305208N

PROGRAM ELEMENT TITLE: DISTRIBUTED COMMON GROUND

PROJECT NUMBER: A2174

**PROJECT TITLE: JOINT SERVICE IMAGERY
PROCESSING SYSTEMS**

E. SCHEDULE PROFILE

	FY96	FY97	FY98	FY99	FY00	FY01	FY02	FY03
DWSA	<p>DWSA Refresh</p>							
NS	<p>JCA Xsition & PTW Refresh</p>							
TIS	<p>CIP Prototype</p> <p>DT-HID</p> <p>LRIP</p> <p>IOC</p> <p>TECEVAL</p> <p>OFEVAL</p> <p>Organic Support Capability</p>							

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EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

DATE: February 1999

BUDGET ACTIVITY: 2

PROGRAM ELEMENT: 0305208N

PROJECT NUMBER: A2174

PROGRAM ELEMENT TITLE: DISTRIBUTED COMMON GROUND

PROJECT TITLE: JOINT SERVICE IMAGERY

SYSTEMS (DCGS)

PROCESSING SYSTEMS

<u>Cost Categories:</u>	<u>Contract Method & Type</u>	<u>Performing Activity & Location</u>	<u>Total Prior Yrs Cost</u> See Note below	<u>FY 1999 Cost</u>	<u>FY 1999 Award Date</u>	<u>FY 2000 Cost</u>	<u>FY 2000 Award Date</u>	<u>Cost to Complete</u>	<u>Total Cost</u>	<u>Target Value of Contract</u>
Primary Hardware Development										
	Hardware Development			\$0						
	Systems Engineering	SPAWAR, San Diego, CA		\$1,525	5/99	\$2,314	5/00	Continuing	Continuing	
	Economy Act	NRL, Washington DC		\$877	5/99	\$1,919	5/00	Continuing	Continuing	
	SS/CPFF	Mitre, Vienna VA		\$500	2/99	\$250	2/00			
	MIPR NRO/OSO, Wash DC			\$750	3/99	\$800	3/00	Continuing	Continuing	
	MIPR	Rome Lab, NY		\$1,080	6/99	\$200	6/00	Continuing	Continuing	
	Subtotal Project Development			\$4,732		\$5,483				

Remarks: None.

Note: FY 1998 budget for this item was submitted as part of the RDT&E Defense-Wide Program, Distributed Common Ground Systems (DCGS), PE 0305208D8Z. OSD Program Decision Memorandum, of 18 August 1998, transferred FY00-05 funding for this program to the services.

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EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

DATE: February 1999

BUDGET ACTIVITY: 2 **PROGRAM ELEMENT: 0305208N** **PROJECT NUMBER: A2174**
PROGRAM ELEMENT TITLE: DISTRIBUTED COMMON GROUND SYSTEMS (DCGS) **PROJECT TITLE: JOINT SERVICE IMAGERY PROCESSING SYSTEMS**

<u>Cost Categories:</u>	<u>Contract Method & Type</u>	<u>Performing Activity & Location</u>	<u>Total Prior Yrs Cost</u>	<u>FY 1999 Cost</u>	<u>FY 1999 Award Date</u>	<u>FY 2000 Cost</u>	<u>FY 2000 Award Date</u>	<u>Cost to Complete</u>	<u>Total Cost</u>	<u>Target Value of Contract</u>
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Developmental Test & Evaluation Test and Evaluation	WX	COMOPTEVFOR, Norfolk, VA		\$100	6/99	\$100	6/00	Continuing	Continuing	
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Subtotal Test & Evaluation

\$100

**Subtotal Management
SBIR Assessment**

\$123

Remarks: None.

Total Cost	See Note Below	\$4,955	\$5,583	Continuing	Continuing
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Note: FY 1998 budget for this item was submitted as part of the RDT&E Defense-Wide Program, Distributed Common Ground Systems (DCGS), PE 0305208D8Z. OSD Program Decision Memorandum, of 18 August 1998, transferred FY00-05 funding for this program to the services.

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FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305927N

PROGRAM ELEMENT TITLE: Naval Space Surveillance

(U) COST: (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1998 ACTUAL	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R0125 Naval Space Surveillance	387	398	712	724	737	749	765	781	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Naval Space Surveillance Fence is an integral component of the U. S. Space Command Space Surveillance Network. This system provides continuous surveillance and unaltered detection of space objects crossing the Continental United States. The fence is also the only space surveillance system which provides satellite vulnerability and space control data to the fleet. It is a multistatic continuous wave radar fence consisting of three transmitter sites, six receiver sites, and a computation/communication center. The Alternate Space Control role assigned by U.S. Commander in Chief Space (USCINCSpace), requires that the Naval Space Command Mission System maintain functional equivalence with the USCINCSpace Space Control Center and receive, process, and distribute data from 26 surveillance sites. The increase in funding FY00 and out supports this role and the research and development of high-powered transmitters and other system component parts for the next generation fence system to reduce risk in the implementation phase.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it encompasses engineering and manufacturing development for upgrading existing operational systems.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

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Budget Item Justification
(Exhibit R-2, page 1 of 4)

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FY 2000/2001 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0305927N PROJECT NUMBER: R0125
PROGRAM ELEMENT TITLE: Naval Space Surveillance PROJECT TITLE: Naval Space Surveillance

1. (U) FY 1998 ACCOMPLISHMENTS:
 - (U) (\$192) Improved accuracy and consistency of chip processing techniques.
 - (U) (\$175) Studied and analyzed the geodetic positional alignment of the space surveillance radar system and determined the effect on system performance.
 - (U) (\$ 20) Traveled in support of Naval Space Surveillance Fence.
2. (U) FY 1999 PLAN:
 - (U) (\$190) Evaluate tradeoffs in prototype S band feed assembly as part of a large antenna array.
 - (U) (\$100) Evaluate impacts to current system of S band implementation.
 - (U) (\$ 99) Demonstrate impact of high volume (10-100X) processing on multiple site integration.
 - (U) (\$ 9) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.
3. (U) FY 2000 PLAN:
 - (U) (\$190) Assess impact of chirp processing to S-band operations.
 - (U) (\$150) Study system designing trades for S-band operations.
 - (U) (\$100) Evaluate multi-frequency detection processing.
 - (U) (\$150) Verify high volume processing algorithms.
 - (U) (\$122) Study improved drag processing for low orbits.

B. (U) PROGRAM CHANGE SUMMARY:

(U) FY 1999 President's Budget:
(U) Appropriated Value:

FY 1998	FY 1999	FY 2000
387	399	722
	399	-

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Budget Item Justification
(Exhibit R-2, page 2 of 4)

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FY 2000/2001 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0305927N

PROJECT NUMBER: R0125

PROGRAM ELEMENT TITLE: Naval Space Surveillance

PROJECT TITLE: Naval Space Surveillance

(U) Adjustments from FY 1999 PRESUDG:
(U) FY 2000 President's Submission:

0	-1	-10
387	398	712

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY99 adjustments are due to Revised Economic Assumption (-1K). FY00 adjustment is due to Non Pay Inflation (-10).
(U) Schedule: Not applicable.
(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E: Not applicable.

D. (U) SCHEDULE PROFILE: Not applicable.

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Budget Item Justification
(Exhibit R-2, page 3 of 4)

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FY 2000 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0305927N
PROGRAM ELEMENT TITLE: Naval Space Surveillance

PROJECT NUMBER: R0125
PROJECT TITLE: Naval Space Surveillance

A. (U) PROJECT COST BREAKDOWN: (\$ in thousands)

Project Cost Categories	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
a. Project Management	20	15	20
b. Product Development	367	384	692
Total	387	398	712

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RDT&E PE/Project Cost Breakdown
(Exhibit R-3, page 4 of 4)

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Exhibit R-2, RDT&E Budget Item Justification										Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E,N Budget Activity 4										
R-1 ITEM NOMENCLATURE Program Element: 0305972 Program Element Title: Integrated Broadcast Service										
COST (\$ in Millions)	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	FY2004	FY2005	Cost to Complete	Total Cost
Total PE Cost	0	14,546	0	0	0	0	0	0	CONT	CONT
4778 Integrated Broadcast Service	0	14,546	0	0	0	0	0	0	CONT	CONT
Project B Name/No. & subtotal cost										
Project C Name/No. & subtotal cost										
Quantity of RDT&E Articles	0	2	0	0	0	0	0	0		
A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Integrated Broadcast Service (IBS) provides warfighters with critical and highly perishable intelligence and information in a single, correlated picture via a near-real-time, integrated dissemination architecture. IBS consolidates existing intelligence broadcast systems into a common-format, common-terminal, theater-tailored architecture. The IBS design incorporates new functionality in broadcast and information management, a new message format, and a new receiver. It fields four Information Management Elements to geographic CINCs that perform requirements as set forth in the Joint Operational Requirements Document. <ul style="list-style-type: none"> • Accept data from dissimilar, geographically-dispersed data sources including airborne, space-based, shipborne and ground SIGINT, radar and infrared sensors. • Transmit intelligence and information to end users equipped with JTT or terminals which incorporate the CIBS-M. • Disseminate theater oriented, based, and focused intelligence and information, based on user generated and CINC validated dissemination priorities. • Disseminate intelligence and information over various communications paths, based on the communications available to the end user. 										
(U) PROGRAM ACCOMPLISHMENTS AND PLANS										
(U) FY 1999 ACCOMPLISHMENTS <ul style="list-style-type: none"> • (U) (\$1,366) Maintain a Program Management Office, including program supervision, finance and acquisition strategy development • (U) (\$3,650) Perform System Engineering, including design of message format, maintenance of architectures, and system configuration control • (U) (\$8,416) Design, build and field the initial Information Management Element (IME) (Spiral #1) • (U)(\$ 800) Test initial IME in CUBE and CANX before fielding in Pacific Command (PACOM) • (U) (\$ 314) AMB Development 										
(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is in budget activity 4 because it includes demonstrating and validating the use of technologies to create an operational integrated broadcast service.										

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 Budget Item Justification
 (Exhibit R-2, Page 1 of 3)

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Exhibit R-2, RDT&E Budget Item Justification

Date: February 1999

B. Program Change Summary:

(U) Funding: FY1999 adjustments due to Economic Assumptions (-34).

C. Other Program Funding Summary

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>TotalCost</u>
(U) Previous President's Budget (FY 1999 PB)	0		0		TBD
(U) Appropriated Value		14,580			TBD

(U) Adjustments to Appropriated Value

a. Cong Reductions

b. SBIR

c. Omnibus or Other Above Threshold Reprogram

d. Below Threshold Reprogramming

(U) Adjustments to Budget Years Since FY 1999 PB

a. IPDM

b. PBD 602/604 (Inflation)

(U) Current Budget Submit/ FY 2000 PB

14,546

(U) Significant Program Changes:

USN received \$24.9M in a Congressional transfer of IBS and IBS legacy funds in the FY 1999 budget: \$14.580M in RDT&E, \$10.271M in OPN. FY1999 adjustments (-34) Economic Assumptions.

D. Other Program Funding Summary (\$ in Thousands)

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>TotalCost</u>
(U) OPN/PE0305972N	0	10,271	0	0	0	0	0	0	10,271

(U) E. Acquisition Strategy

IBS will use a spiral development program to create a common dissemination architecture. Systems and technology will be contracted for under a competitive Request for Proposal (RFP) process.

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Budget Item Justification
(Exhibit R-2, Page 2 of 3)

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Exhibit R-2, RDT&E Budget Item Justification

Date: February 1999

(U) F. Schedule Profile	FY 1998				FY 1999				FY 2000				FY 2001			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
(U) Master Acquisition Plan																
(U) Spiral 1				*												
(U) - Design				*												
(U) - Development				*												
(U) - Accreditation Efforts Begin				*												
(U) - CANX/CUBE Activities Begin					*											
(U) - Product Build																
(U) - PACOM Preparations																
(U) - PACOM Delivery																
(U) Spiral 2																
(U) - Concept																
(U) - Develop RFP																
(U) - Award Contract																
(U) - Delivery																
(U) Spiral 3																
(U) - Concept																
(U) - Develop RFP																
(U) - Award Contract																
(U) - Delivery (1QFY02)																

* - Denotes completed event
X - Denotes planned event

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Budget Item Justification
(Exhibit R-2, Page 3 of 3)

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FY 2000 PRESIDENTS BUDGET
R-2A RDT&EN BUDGET ITEM JUSTIFICATION SHEET

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0308601N
PROGRAM ELEMENT TITLE: Modeling and Simulation Program

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1998 ACTUAL	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X2222 Naval Modeling & Simulation										
	4,212	0	9621	9677	8922	9195	11,663	12,294	Cont	Cont

* Note: In 1999, the program was funded and executed in P.E. 0605853N

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Funds the efforts of Navy Modeling and Simulation (M&S) Management Office and the Department of the Navy Technical Support Group (TSG). Supports technical and management initiatives directed by Congress, DoD and SECNAV with the aim of bringing organization and focus to the development and use of M&S tools throughout Navy and DoD. It provides a central agency for the formulation and implementation of policy and guidance in M&S; represents Navy interests in Joint/other Agency. Funds efforts to define and coordinate execution of a Navy M&S program to evolve an interoperable and reusable core M&S capability consistent with the M&S technical framework prescribed by DoD. Efforts are organized around 4 product areas: (1) Engineering Studies and Analysis, to define the feasibility and applicability of proposed standards to Navy and to investigate service unique requirements for standards or guidance; (2) Products and Services, to develop the policy, standards, and common tools and services necessary to guide more efficient development and use of M&S across Navy; this includes development and management of the Navy M&S Information System (NMSIS), Navy counterpart to the DOD M&S Resource Repository, to provide a central M&S information resource to reduce stovepiped development, promote tool reuse and support informed M&S investment decisions; (3) M&S Quality Assurance Program, to establish and manage a disciplined process of model verification, validation and accreditation (VV&A) required by current directives; (4) Simulation Experiments, to test distributive simulation technology in fleet exercises, experiments, and pilot efforts which demonstrate and examine the value and limitations of proposed standards (such as HLA and JMASS) to mission and program requirements.

Note: In FY 2000 a Technical Change moves the Naval Modeling and Simulation X2222 Project from Program Element 0605853N to Program Element 0308601N in order to more accurately describe the Naval Modeling and Simulation Project.

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Exhibit R-2, RDT&E Budget Item Justification
(Exhibit R-2, page 1 of 6)

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FY 2000 PRESIDENTS BUDGET
R-2A RDT&EN BUDGET ITEM JUSTIFICATION SHEET

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0308601N

PROGRAM ELEMENT TITLE: Modeling and Simulation Program

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1998 ACCOMPLISHMENTS:

- (U) (\$ 762) Engineering Studies and Analysis: Developed Navy strategy for the transition of Navy M&S to the OSD-mandated M&S interoperability standard, High Level Architecture (HLA). Led Navy HLA implementation planning, reported Navy compliance intentions to DoD and participated in the DoD HLA transition working group. Briefed Navy flags, intra and inter service forums on the issues and technical implications of Navy M&S compliance with HLA. Completed Phase I of Maritime Virtual Environmental Data Specification (MARVEDS), initial analysis and feasibility of approach to developing an information model, data format, data dictionary, algorithms, techniques, and database management system that can define and mediate the environmental data required to enable a virtual prototype. This type of standard for simulation environments is critical to enabling Simulation Based Acquisition (SBA). Developed a roadmap for migrating existing standalone logistics modeling capability into a more integrated, interoperable core suite of capability to support both operational logistics and long term logistics wargaming and assessment. Logistic study was directly applicable to the development of the M&S Investment Plan.
- (U) (\$2,271) Products and Services: Developed an initial prototype of the web-based Navy Modeling and Simulation Information System (NMSIS), the Naval component of the DoD M&S resource repository (part of the DoD M&S Framework). Updated and provided user assistance and support on the Naval M&S Catalog; added HLA compliance information for Navy systems. Supported planning and technical coordination of efforts across Navy M&S Functional Areas, other Services, OSD, Joint Staff, and other agencies to develop policies and procedures for M&S standardization. Coordinated and chaired Navy's M&S Working Group and Navy Flag M&S Steering Group; participated in the Defense M&S Office's M&S working group and the DoD M&S Executive Council, including separate forums for training, assessments & acquisition; and coordination of technical reviews of joint programs and initiatives (JSIMS, JWARS, JMASS and NETWARS). Developed draft of DoD and SECNAV-required Navy M&S Investment Plan and developed and coordinated draft/final review and approval of SECNAV Instruction for Navy M&S VV&A. Provided M&S education and information services to the full spectrum of M&S developers and users via production and dissemination of a Navy M&S information video; home page maintenance and distribution of informational brochures; established Navy Postgraduate School curriculum on M&S development and application; and participation in select OSD and industry sponsored symposia. Initiated effort to define a common technical framework to support consistent evaluation and measurement of C4I return on investment and provided Navy requirements in the Joint development of a Network Warfare Simulation (NETWARS), a key element in the establishment of a common technical framework for consistent C4I analysis across DoD.

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Exhibit R-2, RDT&E Budget Item Justification
(Exhibit R-2, page 2 of 6)

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FY 2000 PRESIDENTS BUDGET
R-2A RDT&EN BUDGET ITEM JUSTIFICATION SHEET

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0308601N

PROGRAM ELEMENT TITLE: Modeling and Simulation Program

- (U) (\$ 555) M&S Quality Assurance Program: Developed Navy process and guidelines for Verification, Validation, and Accreditation (VV&A) of M&S and a process of Verification, Validation, and Certification (VW&C) for data. Provided technical review on M&S VV&A plans and reports and provided subject matter expertise and advice on how to meet Navy policy requirements within existing fiscal and programmatic constraints. Developed the Naval M&S VV&A/VW&C repository. Developed and implemented a prototype web-based distributed interactive VV&A/VW&C training capability for M&S developers and accredited users.
- (U) (\$ 624) Simulation Experiments: Provided Navy share of Services' contribution to maintenance of the simulation protocol needed to use Joint Training Confederation simulations in Joint Task Force Exercises. Ensured simulation of Naval forces supported Navy participation in Joint exercises; supported Ulchi Focus Lens, Synthetic Theater of War, and United Endeavor. Identified initial suite of existing M&S tools to offer near term relevance and application to the goals of the Maritime Battle Center (MBC) and the ongoing evaluation of systems and technologies in reoccurring Fleet Battle Experiments (FBE). Participated in OSD effort to develop a definition, functional description, and implementation plan for simulation-based acquisition.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

2. (U) FY 1999 Plan: Program was funded and executed in PE0605853N

3. (U) FY 2000 PLAN:

- (U) (\$1,713) Engineering Studies and Analysis: Conduct engineering studies and analysis aimed at determining the feasibility and applicability of proposed standards or technical approaches to Navy and at investigating service unique requirements for standards or guidance. Individual study thrusts will focus on developing or evaluating approaches to optimize training, assessments and acquisition functional/mission objectives through more efficient development and use of M&S. Develop standards for modeling communication networks and information systems with the overarching objective of facilitating the development of a core, reusable, communications M&S capability which supports the full range of architecture and engineering design and analysis requirements across Navy. Support the Naval Postgraduate School Modeling and Simulation degree program, Modeling, Virtual Environments and Simulation (MOVES) curriculum.
- (U) (\$3,698) Products and Services: Continue development of common services, tools, and data bases. Develop the Navy Modeling and Simulation Information System (NMSIS), through an evolutionary process, integrating standards, standard data and connectivity to support all Naval assessments, training, acquisition and operational communities. Manage and maintain the Navy Modeling and Simulation Information System (NMSIS), as a central M&S information resource to reduce stovepiped development, promote standardization and reuse and

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Exhibit R-2, RDT&E Budget Item Justification
(Exhibit R-2, page 3 of 6)

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FY 2000 PRESIDENTS BUDGET
R-2A RDT&EN BUDGET ITEM JUSTIFICATION SHEET

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0308601N

PROGRAM ELEMENT TITLE: Modeling and Simulation Program

support informed M&S investment decision making across Navy. Provide the necessary planning and coordination of M&S efforts across the Navy M&S Functional Areas, other Services, OSD, Joint Staff, and other agencies to develop policies and procedures necessary for M&S standardization within the Navy. Provide annual updates to the Naval M&S Catalog, Master Plan, and Investment Strategy.

- (U) (\$790) M&S Quality Assurance Program: Continue to implement and manage the M&S Quality Assurance development of the Verification, Validation, and Accreditation (VV&A) process and guidelines for modeling and simulation and the Verification, Validation, and Certification (VV&C) process and guidelines for data. Continue implementation of the VV&A/VV&C process and review on both new and legacy M&S plans and reports. Develop and maintain the Naval M&S VV&A/VV&C repository. Establish and implement a VV&A/VV&C training curriculum for developers and accreditors. Provide annual VV&A/VV&C assessment to the CNO.
 - (U) (\$3,420) Simulation Experiments: Support Fleet Exercise simulation experiments and the application of distributed simulation to a wide variety of operational, research and development, training, test and evaluation exercises. Develop a series of simulation projects to test and evolve the standards for models, interfaces, data, and tools necessary to enable the seamless access and use of operationally relevant M&S to support the range of Navy training, warfare assessments and acquisition requirements.
- B. (U) PROGRAM CHANGE SUMMARY: In FY 2000, Funds were decreased -\$105K for Budget Submitting Office realignment, -139K for Non Pay Inflation, and -7K for Working Capital-NAWC. It was increased +50K for NCWF rate adjustments and +22K for Civilian Pay Rates.
- (U) OTHER PROGRAM FUNDING SUMMARY:
- O&M,N PE0204662N/1C1C (Partial) FY1998 FY1999 FY2000
(SEE PE 0605853N) 877
- (U) RELATED RDT&E: Not applicable.
- D. (U) SCHEDULE PROFILE: Not applicable.

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Exhibit R-2, RDT&E Budget Item Justification
(Exhibit R-2, page 4 of 6)

Exhibit R-3 Cost Analysis (page 1)				Date FEBRUARY 1999				PROJECT NAME AND NUMBER: Modeling & Simulation, X2222			
APPROPRIATION/BUDGET ACTIVITY: 7				PROGRAM ELEMENT: 0308601N							
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY-99 Cost	FY-99 Award Date	FY-00 Cost	FY-00 Award Date	FY-01 Cost	FY-01 Award Date	Cost To Complete	Target Value of Contract
Navy M&S Info Syst Developmt	Various	Various	-	-	-	1825	TBD		TBD	Cont.	Cont.
Quality Assurance	Various	Various	555	-	-	790	TBD		TBD	Cont.	Cont.
Subtotal Product Development			555			2615				Cont.	Cont.
Remarks:											
M&S Services	Various	Various	2373	-	-	1873	TBD		TBD	Cont.	Cont.
Subtotal Support			2373			1873				Cont.	Cont.
Remarks											

Exhibit R-3, Project Cost Analysis

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Exhibit R-2, RDT&E Budget Item Justification
(Exhibit R-2, page 5 of 6)

Exhibit R-3 Cost Analysis (page 2)										Date: FEBRUARY 1998		
APPROPRIATION/BUDGET ACTIVITY: 7				PROGRAM ELEMENT: 030860IN				PROJECT NAME AND NUMBER: Modeling & Simulation, X2222				
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY-99 Cost	FY-99 Award Date	FY-00 Cost	FY-00 Award Date	FY-01 Cost	FY-01 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Simulation Experiments	Various	Various	627	-	-	3420	TBD		TBD	Cont.	Cont.	Cont.
Subtotal T&E			627			3420				Cont.	Cont.	Cont.
Remarks												
Engineering Studies/Analyses	Various	Various	592	-	-	1713	TBD		TBD	Cont.	Cont.	Cont.
Program Management			65								Cont.	Cont.
Subtotal Management			657			1713				Cont.	Cont.	Cont.
Remarks												
Total Cost			4212	0		9621						

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Exhibit R-2, RDT&E Budget Item Justification
(Exhibit R-2, page 6 of 6)

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EXHIBIT R-2, FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0702207N

PROGRAM ELEMENT TITLE: Depot Maintenance (Non-IF)

(U) COST: (Dollars in Thousands)

<u>Project Number & Title</u>	<u>FY 1998 Budget</u>	<u>FY 1999 Budget</u>	<u>FY 2000 Estimate</u>	<u>FY 2001 Estimate</u>	<u>FY 2002 Estimate</u>	<u>FY 2003 Estimate</u>	<u>FY 2004 Estimate</u>	<u>FY 2005 Estimate</u>	<u>To Complete</u>	<u>Total Program</u>
H2451 P-3C SLAP	0	28,123	24,023	19,295	0	0	0	0	0	71,441
H2452 S-3 SLAP	0	23,634	14,230	4,691	0	0	0	0	0	42,555
W2454 AN/ARC-210-RT-1794(C)*	0	6,445	1,733	576	766	0	0	0	0	9,520
TOTAL	0	58,202	39,986	24,562	766	0	0	0	0	123,516

Quantity of RDT&E Articles

* W2454 was previously funded as H2454.

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Service Life Assessment Program (SLAP) on the P-3C (H2451) and S-3B (H2452) began in FY 1999. These efforts are required to be conducted for these airframes to ascertain what actions must be taken to safely operate each system until the targeted end of service life. The results of the SLAP also provide justification for funding a Service Life Extension Program (SLEP) for fatigue limiting components with APN-5 funding if necessary. The AN/ARC-210 - RT-1794(C) (W2454) will provide for the development of radio software modifications required for upgrades to the evolving standards.

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0702207N

PROJECT NUMBER: H2451
PROJECT TITLE: P-3 SLAP

PROGRAM ELEMENT TITLE: Depot Maintenance

(U) COST: (Dollars in Thousands)

<u>Project Number & Title</u>	<u>FY 1998</u> <u>Budget</u>	<u>FY 1999</u> <u>Budget</u>	<u>FY 2000</u> <u>Estimate</u>	<u>FY 2001</u> <u>Estimate</u>	<u>FY 2002</u> <u>Estimate</u>	<u>FY 2003</u> <u>Estimate</u>	<u>FY 2004</u> <u>Estimate</u>	<u>FY 2005</u> <u>Estimate</u>	<u>To</u> <u>Complete</u>	<u>Total</u> <u>Program</u>
H2451 P-3 SLAP	0	28,123	24,023	19,295	0	0	0	0	0	71,441
TOTAL	0	28,123	24,023	19,295	0	0	0	0	0	71,441

Quantity of RDT&E Articles

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The P-3C Service Life Assessment Program (SLAP) will perform Non-Recurring Engineering (NRE) for the P-3C Service Life Extension Program (SLEP) (OSIP 02-99). SLAP includes a fatigue article destructive test of a full scale P-3C, associated pre-test and post-test analyses, NRE for designing SLEP kits, and post-test disposal. SLEP is a fatigue life extension program that will extend operational service life by replacing fatigue limiting airframe components. Present fatigue life estimates (from 20,000 to 24,000 flight hours) are based on analysis alone. SLAP will identify specific components that require replacement or modification in order to extend the aircraft model's service life beyond its original design parameters by approximately 6,000 flight hours. This SLAP effort was previously budgeted under APN-5 (BLI 538) funding within OSIP 02-99.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1998 ACCOMPLISHMENTS: Not Applicable.

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0702207N

PROJECT NUMBER: H2451

PROGRAM ELEMENT TITLE: Depot Maintenance

PROJECT TITLE: P-3 SLAP

2. FY 1999 PLAN:

(U) (\$25,222) Reaction frame buildup, pre-analysis, aircraft preparation.

(U) (\$ 257) Data: Preliminary engineering reports, quality assurance reports, preliminary SLEP drawings, cost schedule status reporting.

(U) (\$ 522) Contract Support Services.

(U) (\$ 1,429) Naval Air Warfare Center (NAWC) field support.

(U) (\$ 693) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. FY 2000 PLAN:

(U) (\$21,292) Fatigue article test.

(U) (\$ 550) Data: Preliminary

(U) (\$ 1,157) Contract support services.

(U) (\$ 1,024) Naval Air Warfare Center (NAWC) field support.

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0702207N

PROGRAM ELEMENT TITLE: Depot Maintenance

PROJECT NUMBER: H2451

PROJECT TITLE: P-3 SLAP

(U) B. PROGRAM CHANGE SUMMARY

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
(U) FY 1999 President's Budget:	0	28,694	24,376
(U) Appropriated Value:	0	28,694	
(U) Adjustments from Pres Budget:	0	-571	-353
(U) FY 2000 President's Budget Submit:	0	28,123	24,023

CHANGE SUMMARY EXPLANATION:

(U) Funding: The net decrease of (-\$571 thousand) in FY 1999 includes a Revised Economic Assessment of -\$66 thousand and a Contract Advisory and Assistance Services adjustment of -\$505 thousand. The net decrease of (-\$353 thousand) in FY 2000 includes a Non Pay Inflation adjustment of -\$347 thousand and -\$6 thousand for minor pricing adjustments.

(U) Schedule: The Fatigue Test milestone was moved from FY 2001 to FY 2000 to correct a typographical error from the last budget submit. The SLEP Kit Data Package milestone also moved from FY 2001 to FY 2000 to correct a typographical error.

(U) Technical: Not Applicable.

(U) C. OTHER PROGRAM FUNDING SUMMARY: Not Applicable

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UNCLASSIFIED**

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

PROJECT NUMBER: H2451
PROJECT TITLE: P-3 SLAP

PROGRAM ELEMENT: 0702207N
PROGRAM ELEMENT TITLE: Depot Maintenance

BUDGET ACTIVITY: 7

(U) D. ACQUISITION STRATEGY: SLAP is a full and open competition for a fatigue article test. The contract will be a cost plus incentive fee (CPFF), therefore, providing an incentive to the contractor to effectively manage program cost and schedule. This program is in the source selection process. Anticipate contract award by December 1998. SLAP supports the Secretary of the Navy's Maritime Patrol Aircraft Ten Year Plan.

(U) E. SCHEDULE PROFILE

FY 1998 FY 1999 FY 2000 TO COMPLETE

(U) Program Milestones

(U) Engineering Milestones

Prelim. Design Review (2Q)
Critical Design Review (3Q)
1Q/00 Conduct Fatigue Test
4Q/00 SLEP Kit Data Package

(U) T&E Milestones

(U) Contract Milestones

Contract Award (1Q)

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EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0702207N

PROJECT NUMBER: H2451
PROJECT TITLE: P-3 SLAP

<u>Cost Categories:</u>	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999		FY 2000		Cost to Complete	Total Cost	Target Value of Contract
				Cost	Award Date	Cost	Award Date			
Contracts	CPIF	TBD	0	25,479	Mar 99	21,842	Nov 99	16,833	64,154	64,154
Award Fees			0	0		0				
Subtotal Product Development			0	25,479		21,842		16,833	64,154	64,154
Remarks:										
Field Activity Support	WX	NAWCAD	0	1,429	Nov 98	1,024	Nov 99	1,370	3,823	3,823
Award Fees		Pax River, MD	0	0		0				
Subtotal Support			0	1,429		1,024		1,370	3,823	3,823
Remarks:										
Subtotal Test & Evaluation			0	0		0		0	0	
Remarks:										
Contracts	CPIF	TBD	0	522	Nov 98	1,157	Nov 99	1,092	2,771	2,771
Award Fees			0	0		0				
Subtotal Management			0	522		1,157		1,092	2,771	2,771
Remarks:										
FY 1999 SBIR Assessment				693				0	693	
Total Cost			0	28,123		24,023		19,295	71,441	70,748

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

PROJECT NUMBER: H 2452
PROJECT TITLE: S-3 SLAP

PROGRAM ELEMENT: 0702207N
PROGRAM ELEMENT TITLE: Depot Maintenance

BUDGET ACTIVITY: 7

(U) COST: (Dollars in Thousands)

<u>Project Number & Title</u>	<u>FY 1998 Budget</u>	<u>FY 1999 Budget</u>	<u>FY 2000 Estimate</u>	<u>FY 2001 Estimate</u>	<u>FY 2002 Estimate</u>	<u>FY 2003 Estimate</u>	<u>FY 2004 Estimate</u>	<u>FY 2005 Estimate</u>	<u>To Complete</u>	<u>Total Program</u>
H2452 S-3 SLAP	0	23,634	14,230	4,691	0	0	0	0	0	42,555
TOTAL	0	23,634	14,230	4,691	0	0	0	0	0	42,555

Quantity of RDT&E Articles

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The S-3 Service Life Assessment Program (SLAP) (H2452) will determine the present S-3B fatigue for 113 aircraft which were all procured from 1972 to 1976. The intent is to determine the magnitude of the Service Life Extension Program (SLEP) necessary to extend the aircraft service life through 2015. The SLAP will certify an increase of the aircraft fatigue life from 13,000 flight hours to approximately 17,500 flight hours and from 3,000 to 4,300 catapults/arrested landings. This SLAP effort was previously budgeted under APN-5 (BLI 541) funding within OSIP 12-95.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1998 ACCOMPLISHMENTS: Not Applicable.

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0702207N

PROGRAM ELEMENT TITLE: Depot Maintenance

PROJECT NUMBER: H2452

PROJECT TITLE: S-3 SLAP

2. FY 1999 PLAN:

(U) (\$22,350) Award Service Life Assessment Program (SLAP)/Full Scale Fatigue Test (FSFT) contract option.

(U) (\$) 570) Establish field activity support for SLAP/FSFT efforts.

(U) (\$) 139) Contract support services.

(U) (\$) 575) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. FY 2000 PLAN:

(U) (\$13,545) Continuing SLAP/FSFT.

(U) (\$) 495) Continuing field activity support for SLAP/FSFT efforts.

(U) (\$) 190) Contract support services.

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

PROJECT NUMBER: H2452
PROJECT TITLE: S-3 SLAP

PROGRAM ELEMENT: 0702207N
PROGRAM ELEMENT TITLE: Depot Maintenance

BUDGET ACTIVITY: 7

(U) B. PROGRAM CHANGE SUMMARY

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
(U) FY 1999 President's Budget:	0	23,781	14,489
(U) Appropriated Value:	0	23,781	
(U) Adjustments from Pres Budget:	0	-147	-259
(U) FY 2000 President's Budget Submit:	0	23,634	14,230

CHANGE SUMMARY EXPLANATION:

(U) Funding: The net decrease of (-\$147 thousand) in FY 1999 includes -\$56 thousand for minor pricing adjustments and a Contract Advisory and Assistance Services adjustment of -\$91 thousand. The net decrease of (-\$259 thousand) in FY 2000 includes a Non Pay Inflation adjustment of -\$206 thousand and -\$53 thousand for minor pricing adjustments.

(U) Schedule: Not Applicable.

(U) Technical: Not Applicable.

(U) C. OTHER PROGRAM FUNDING SUMMARY

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>To</u>
<u>Budget</u>	10,941	10,160	8,836	12,462	9,814	6,674	4,229	2,569	<u>Complete</u>
APN S-3 (OSIP 12-95)									0
APN ES-3 (OSIP 33-95)	1,521	0	0	0	0	0	0	0	0

NOTE: Both critical structure OSIPs contain all S-3B/ES-3A structural degraders, not just those associated with SLAP.

Related RDT&E

None.

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EXHIBIT R-2a, FY 2000/2001 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0702207N

PROGRAM ELEMENT TITLE: Depot Maintenance

PROJECT NUMBER: H2452

PROJECT TITLE: S-3 SLAP

(U) D. ACQUISITION STRATEGY: The S-3Service Life Assessment Program will be a sole source procurement to the Original Equipment Manufacturer, Lockheed Martin of Marietta, GA. This program will utilize a cost plus incentive type contract.

(U) E. SCHEDULE PROFILE

<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>TO COMPLETE</u>
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(U) Program Milestones

(U) Engineering Milestones

Test Fixture Test Fixture
Design Analysis(3Q) Design and
Test Spectrum Assembly
Development (1Q-4Q) (1Q-3Q)

(U) T&E Milestones

Full Scale
Test (4Q)

Full Scale
Test (1Q-4Q)

(U) Contract Milestones

Contract
Award (1Q)

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EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0702207N

PROJECT NUMBER: H2452

PROJECT TITLE: S-3 SLAP

Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999		FY 2000		Cost to Complete	Total Cost	Target Value of Contract
			Cost	Award Date	Cost	Award Date			
SS/CPIF	LMAS/Marietta, GA	0	20,136	Nov 98	13,545	Nov 99	4,226	37,907	37,907
Award Fees		0	0		0				

Subtotal Product Development

0 20,136 13,545 4,226 37,907 37,907

Remarks:

Contracts
Award Fees

C/FFP TBD 0 250 190 120 560 560

Subtotal Support

0 250 190 120 560 560

Remarks:

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EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0702207N

PROJECT NUMBER: H2452

PROJECT TITLE: S-3 SLAP

Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999		FY 2000		FY 2000 Award Date	Cost to Complete	Total Cost	Target Value of Contract
			Cost	Date	Cost	Date				
WX	NAWC/AD	0	2,273	Nov 98	20	Nov 99		20	2,313	
	Pax River, MD	0	0		0					
Subtotal Test & Evaluation										
		0	2,273		20			20	2,313	
Remarks:										
Management	NADEP	0	400	Nov 98	475	Nov 99		325	1,200	
Award Fees	North Island, CA	0	0		0					
Subtotal Management										
		0	400		475			325	1,200	
Remarks:										
FY 1999 SBIR Assessment			575						575	
Total Cost		0	23,634		14,230			4,691	42,555	38,467

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0702207N** **PROJECT NUMBER: W2454**
PROGRAM ELEMENT TITLE: DEPOT MAINTENANCE **PROJECT TITLE: AN/ARC-210 RT-1794(C)**

(U) COST: (Dollars in Thousands)

<u>Project Number & Title</u>	<u>FY 1998 Budget</u>	<u>FY 1999 Budget</u>	<u>FY 2000 Estimate</u>	<u>FY 2001 Estimate</u>	<u>FY 2002 Estimate</u>	<u>FY 2003 Estimate</u>	<u>FY 2004 Estimate</u>	<u>FY 2005 Estimate</u>	<u>To Complete</u>	<u>Total Program</u>
W2454 AN/ARC-210 RT-1794(C)*	0	6,445	1,733	576	766	0	0	0	0	9,520
TOTAL	0	6,445	1,733	576	766	0	0	0	0	9,520

Quantity of RDT&E Articles

*The project unit designator was changed from H2454 to W2454

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Project W2454, AN/ARC-210 RT-1794(C): This project provides for the development of radio software modifications required for upgrades to the evolving standards. Annual engineering change proposals to accomplish implementation of additional advanced waveforms, have been planned to maintain interoperability/connectivity with other services, FAA and ICAO (commercial air traffic data links). Implementation of these waveforms is essential and will be accomplished in the Fleet by organizational units via the Memory Loader Verifier System (MLVS). These changes are the responsibility of the radio program for funding, management, and execution.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1998 ACCOMPLISHMENTS: Not Applicable

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0702207N

PROGRAM ELEMENT TITLE: DEPOT MAINTENANCE

PROJECT NUMBER: W2454

PROJECT TITLE: AN/ARC-210 RT-1794(C)

2. FY 1999 PLAN:

(U) (\$6,295) Develop upgrades and initiate Engineering Change Order (ECO) to meet requirements for DAMA SATCOM waveform standards upgrade; digital battlefield interoperability/connectivity communications; and commercial air traffic management data links.

(U) (\$ 150) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. FY 2000 PLAN:

(U) (\$1,733) Develop upgrades and initiate Engineering Change Order (ECO) to meet requirements for upgrades to MIL STD 188-220, variable message formatting, and communications security.

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0702207N

PROGRAM ELEMENT TITLE: DEPOT MAINTENANCE

PROJECT NUMBER: W2454

PROJECT TITLE: AN/ARC-210 RT-1794(C)

(U) B. PROGRAM CHANGE SUMMARY

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
(U) FY 1999 President's Budget:	0	6,486	1,762
(U) Appropriated Value:	0	6,486	
(U) Adjustments from Pres Budget:	0	-41	-29
(U) FY 2000 President's Budget Submit:	0	6,445	1,733

CHANGE SUMMARY EXPLANATION:

(U) Funding: The decrease of -\$41 thousand in FY 1999 reflects congressional undistributed reductions. The decrease of -\$29 thousand in FY 2000 reflects minor pricing adjustments.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

(U) C. OTHER PROGRAM FUNDING SUMMARY

<u>Appn</u>	<u>FY 1998</u> <u>Budget</u>	<u>FY 1999</u> <u>Budget</u>	<u>FY 2000</u> <u>Estimate</u>	<u>FY 2001</u> <u>Estimate</u>	<u>FY 2002</u> <u>Estimate</u>	<u>FY 2003</u> <u>Estimate</u>	<u>FY 2004</u> <u>Estimate</u>	<u>FY 2005</u> <u>Estimate</u>	<u>To</u> <u>Complete</u>
APN L.I. 0577	127,552	100,881	81,599	82,132	65,014	63,592	61,903	62,585	Cont'd

Related RDT&E

None.

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0702207N

PROGRAM ELEMENT TITLE: DEPOT MAINTENANCE

PROJECT NUMBER: W2454

PROJECT TITLE: ARC-210 1794 (C)

(U) D. ACQUISITION STRATEGY: Sole source to Rockwell Collins, Inc. for the production and enhancement of the AN/ARC-210(V) Electronic Radio Protection radios. Contract for production buys is firm fixed price with yearly priced options. Development and enhancement tasks are funded under a Basic Ordering Agreement (BOA).

(U) E. SCHEDULE PROFILE: Not Applicable

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EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT:

0702207N

PROJECT NUMBER:

W2454

PROJECT TITLE:

AN/ARC-210
RT-1794 (C)

Cost Categories:	Contract Method	Performing Activity & Location	Total Prior Yrs	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Prime Eqpm/E&MD Prime Contract	SS/ BOA	Rockwell Collins	0	5,809	2/99	1,427	12/99	852	8,088	8,088
Systems Engineering	Misc	Cedar Rapids, IA	0	200	2/99	52	11/99	30	282	
Subtotal Project Development			0	6,009		1,479		882	8,370	8,088

Remarks:

Contractor Support Systems Engineering	Misc	Misc	0	85	2/99	33	11/99	30	148	
Subtotal Support			0	85		33		30	148	

Remarks

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EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0702207N

PROJECT NUMBER:
PROJECT TITLE:

W2454
AN/ARC-210
RT-1794 (C)

Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999		FY 2000		Cost to Complete	Total Cost	Target Value of Contract
			Cost	Award Date	Cost	Award Date			
Systems T&E	Various	0	75	2/99	200	11/99	400	675	
Subtotal Test & Evaluation									
		0	75		200		400	675	
Remarks									
Travel	WX NAWCAD	0	36	11/98	5	11/99	10	51	
Misc Management Support	Pax River, MD Misc	0	90	11/98	16	11/99	20	126	
Subtotal Management									
		0	126		21		30	177	
Remarks									
SBIR Assessment			150					150	
Total Cost		0	6,445		1,733		1,342	9,520	8,008

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FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0708011N

PROGRAM ELEMENT TITLE: Manufacturing Technology Development

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1998 ACTUAL	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R1050 Manufacturing Technology	51,892	58,909	59,104	60,179	61,406	62,190	62,931	65,472	CONT.	CONT.
R2674 Manufacturing Technology	0	9,977	0	0	0	0	0	0	0	9,977
Total	51,892	68,886	59,104	60,179	61,406	62,190	62,931	65,472	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Manufacturing Technology (MANTECH) Program is intended to improve the productivity and responsiveness of the U.S. defense industrial base by funding the development of manufacturing technologies. The MANTECH program, by providing seed funding for the development of moderate to high risk process and equipment technology, permits contractors to upgrade their manufacturing capabilities. Ultimately, the program aims to produce high-quality weapon systems with shorter lead times and reduced acquisition costs. Major areas of endeavor both underway and planned include: advanced manufacturing technology for electronics assembly, laser metalworking, flexible computer manufacturing, composites, metal working and welding technology. The MANTECH program is being integrated into the Joint Mission Area/Support Area and Joint Warfare Operational Capability process and will utilize the results of these initiatives as appropriate in the program planning process. The MANTECH program is aimed at achieving affordability in the acquisition of weapons systems by inserting manufacturing process solutions early into the design phase to reduce lifecycle costs, improve schedules and ensure quality.

R-1 Line Item 192

Budget Item Justification
(Exhibit R-2, Page 1 of 11)

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FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0708011N

PROGRAM ELEMENT TITLE: Manufacturing Technology Development

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it encompasses engineering and manufacturing development for upgrade of existing, operational systems.

(U) PROGRAM CHANGE FOR TOTAL P.E.:

(U) FY 1999 President's Budget:	FY 1998	FY 1999	FY 2000
(U) Appropriated Value:	53,369	59,060	59,867
(U) Adjustments from FY 1999 PRESBUDG:	-	69,060	-
(U) FY 2000 President's Budget Submission:	-1,477	+9,826	-763
	51,892*	68,886	59,104

* \$22,676 thousand of FY 1997 carryover funding being utilized in addition to the control amount of \$51,892 thousand.

(U) Funding: FY 1998 adjustment is due to Small Business Innovation Research assessment (-1,473) and update to reflect actual execution (-4). FY 1999 adjustment is due to congressional undistributed reductions (-174) and a congressional plus-up to fund MANTECH shortfall (+10,000). FY 2000 adjustment is due to Navy Working Capital Fund rate adjustment (+46), Civilian Pay Rates (+46), and non pay inflation (-855).

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

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Budget Item Justification
(Exhibit R-2, Page 2 of 11)

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FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0708011N

PROGRAM ELEMENT TITLE: Manufacturing Technology Development

PROJECT NUMBER & TITLE	FY 1998 ACTUAL	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R1050										
Manufacturing Technology										
	51,892	58,909	59,104	60,179	61,406	62,190	62,931	65,472	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Manufacturing Technology (MANTECH) Program is intended to improve the productivity and responsiveness of the U.S. defense industrial base by funding the development of manufacturing technologies. The MANTECH program, by providing seed funding for the development of moderate to high risk process and equipment technology, permits contractors to upgrade their manufacturing capabilities. Ultimately, the program aims to produce high-quality weapon systems with shorter lead times and reduced acquisition costs. Major areas of endeavor both underway and planned include: advanced manufacturing technology for electronics assembly, laser metalworking, flexible computer manufacturing, composites, metal working and welding technology. The MANTECH program is being integrated into the Joint Mission Area/Support Area and Joint Warfare Operational Capability process and will utilize the results of these initiatives as appropriate in the program planning process. The MANTECH program is aimed at achieving affordability in the acquisition of weapons systems by inserting manufacturing process solutions early into the design phase to reduce lifecycle costs, improve schedules and ensure quality.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1998 PLAN: (While the control amount for FY 1998 is \$51,892, the actual execution amount is \$74,568 thousand. This reflects \$22,676 thousand of FY 1997 carryover to FY 1998.)

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Budget Item Justification
(Exhibit R-2, Page 3 of 11)

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FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0708011N

PROGRAM ELEMENT TITLE: Manufacturing Technology

Development

PROJECT NUMBER: R1050

PROJECT TITLE: Manufacturing Technology

- (U) The Navy MANTECH program executes a significant amount of its projects through the Centers of Excellence. The technical efforts performed are reflected throughout the following taxonomy:

-- (U) (\$15,087) Composites and Processing Fabrication - Continued the Composites Affordability Initiative, and initiated a Composites Topside Structure project. Continued work on the Fiber Inlet Duct, Gearbox Housing, Composites Shipboard Electronic Cabinets, Rapid Response, Teaching Factories and Korex Phase II. Terminated Fiber Steering for Lightweight Affordable Composite Structures, Z-Direction Reinforcement for Composite Laminates, In situ Fiber Placement, C-Section Composites, and Injection Molded Thermoplastic Bearing Cages.

-- (U) (\$9,000) Electronics Processing and Fabrication - Continued the AEGIS electronics demonstration, continued Flexible manufacturing of microwave vacuum electronic devices, continued Diamond Film Packaging for Transmit Receive Modules, continued Sapphire Dome Coatings, continued Diode Pump Erbium Glass Laser Range Finders, continued Low Cost Manufacture of Infrared Focal Plane Arrays, and continued Manufacture Automation of Monolithic Ring Gyros.

-- (U) (\$25,500) Metals Processing and Fabrication - Completed Programmable Automated Welding System; Weld Fumes; Gas Tungsten Arc Welding Flux for Increased Penetration; Netshape Finishing of Gears by Ausforming; and LaserARC Rapid Response. Cancelled Process Development of Advanced Gear Steels; Condition Based Maintenance; and Manufacturing Improvements for F/A-18 Cockpit Displays. Continued Spray Forming in support of Joint Strike Fighter; Centrifugal Cast Titanium Carbide Bronze Implements; Commercialization of Advanced Welding Consumables; Titanium Welding; Weld Residual Stress and Distortion; Modeling of Clamping Distortions and Prediction of Gear Accuracy; Laser Processing of Nickel Aluminum Bronze; Non-Contact Highspeed Gear Inspection; Adhesive Bondline Integrity, and Underwater Wet Welding. Initiated Distortion and Accuracy Control in Welding. Restarted Laser Pipe Welding.

-- (U) (\$8,750) Advanced Manufacturing Enterprise - Continued efforts in identifying best commercial practices to be incorporated into the Acquisition Reform regime. Initiated efforts to establish a stronger linkage between the Best Manufacturing Practices program and the Acquisition Center of Excellence. Initiate efforts to support the Naval Sea Systems Command Maritime Technology Advanced Shipbuilding Enterprise program. Continued Shipbuilding Supplier Chain Integration in support of the Lean Shipbuilding initiative.

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Budget Item Justification
(Exhibit R-2, Page 4 of 11)

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FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0708011N

PROGRAM ELEMENT TITLE: Manufacturing Technology Development

PROJECT NUMBER: R1050

PROJECT TITLE: Manufacturing Technology

Recompleted the Gulf Coast Region Maritime Technology Center in order to continue shipbuilding efforts such as Non-Toxic Pigment Substitute for Chromium in Primer for Aluminum Substrates, continued Simulation Based Design initiatives, continued Environmental Resource Information Center, continued Research in Shipboard Sensors and continued Effective Aluminum Catamaran Structure Extrusions.

-- (U) (\$16,231) Other - Continued projects in the repair technology arena that support the depots and shipyards such as Supercritical CO2 Parts Cleaning, Ball Valve Repair Process Improvement, Shearography System Development, and Reverse and Re-Engineering Technical Data Generation System. Continued the Ammonium Dinitramide; Low Cost Shaped Charge Munitions Manufacturing; and Improved Technology for Line Charge Manufacturing. Completed the Composite Propellants project in support of energetic materials. Completed technology transfer efforts at the Manufacturing Technology Transfer Center. Continued Phase III of the F414 Engine Demonstration Device with General Electric. Continued Production Tooling for Concept 1 Payload in support of Surface Ship Torpedo Defense. Initiated research efforts in support of the Advanced Shipbuilding Enterprise. Continued efforts in Propulsor Encapsulation. Funded technical engineering work at Navy labs and field activities to support Center projects.

2. (U) FY 1999 PLAN:

- (U) The Navy MANTECH program executes a significant amount of its projects through the Centers of Excellence. The technical efforts performed are reflected throughout the following taxonomy:

-- (U) (\$14,000) Composites Processing and Fabrication - Continue work on the Composites Affordability Initiative, the Composites Topside Structures, KOREX II; Enhanced Production Techniques for Low Observable Structures and Materials; Gearbox Housing; Teaching Factory and Rapid Response projects, and Restart Z-Direction Reinforcement for Composite Laminates. Initiate new effort in Ceramic Matrix Composites and Resin Transfer Molding.

-- (U) (\$10,000) Electronics Processing and Fabrication - Continue AEGIS Electronic Demonstration, Flexible Manufacturing of Microwave Power Module Manufacturing, Learning Center and Demonstration Factory, and the Power Electronic Building Blocks Manufacturing plan. Continue electro-optics efforts in Sapphire Domes,

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Budget Item Justification
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FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0708011N

PROGRAM ELEMENT TITLE: Manufacturing Technology Development

PROJECT NUMBER: R1050

PROJECT TITLE: Manufacturing Technology

Manufacturing Automation of Monolithic Ring Gyros; and initiate efforts for Fiber Optic Velocity Sensors, Remote Source Lighting Technology, Conformal Acoustic Velocity Sensor Accelerometer Manufacturing, Radio Frequency Photonics for Multi-Function Phased Array Antennas, and Affordable Array Technology Tooling.

-- (U) (\$22,850) Metals Processing and Fabrication - Continue the following metalworking projects: Centrifugally Cast Titanium/Chromium Bronze Components, Neodymium Ribbon Development, Optimized Atomization of Magnesium Powder, Titanium Alloy Hearth Melting Processing Technology, Optimized High Strength Lightweight Alloy Welding, and Thin Wall Superalloy Structural Castings. Complete Powder Metallurgy and Materials Initiative. Continue the following joining projects: Weld Residual Stress and Distortion, Titanium Welding, Adhesive Bonding Integrity, Knowledge Based Ultrasonic Testing of Welds, and continue rapid response actions. Continue the following materials processing initiatives: Laser processing of Nickel Aluminum Bronze, Non-Contact High Speed Gear Inspection, Repair/Refurbishment of Fatigue/Wear Limited Navy Structures, Advanced Manufacturing Processes for the Advanced Amphibious Assault Vehicle, and Manufacturing of High Performance of Transmission Housing. Initiate Femto 2nd Laser project to support the Joint Strike Fighter Office. Initiate project in Propulsor Improvements; Smart Sensors/Actuators; Adaptive Control for Mechanized Welding; Amphibious Assault Vehicle (AAV) Enhanced Armor Kit; Nd:YAG Laser Repair of Catapult Troughs; and Improved Through Thickness Properties of Heavy Gauge Steel.

-- (U) (\$6,550) Advanced Manufacturing Enterprise- Continue leveraging the Best Manufacturing Practices and the Acquisition Center of Excellence Acquisition Reform Initiatives. Continue documenting environmental manufacturing and business practices. Continue efforts in shipbuilding and simulation based design. Continue efforts in Shipboard Sensors; Effective Aluminum Catamaran Structures; Chromium Primer for Aluminum Substrates; and the Environmental Resource Information Center. Continue ongoing and initiate new research efforts in support of the Maritime Technology Advanced Shipbuilding Enterprise. Initiate project for Heavy Equipment Repair; Automated Paint Application Containment; Crew Compartment Heater; and AAV Manufacturing Enhancement.

-- (U) (\$4,240) Other - Continue projects in the repair technology arena that support the depots and shipyards. Continue the Ammonium Dinitramide; Low Cost and Improved Line Charge Munitions Manufacturing projects in support of energetic materials. Continue Phase III of the F414 Engine Demonstration Device with General

R-1 Line Item 192

Budget Item Justification
(Exhibit R-2, Page 6 of 11)

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FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0708011N

PROJECT NUMBER: R1050

PROGRAM ELEMENT TITLE: Manufacturing Technology Development

PROJECT TITLE: Manufacturing Technology

Electric. Continue Production Tooling for Concept 1 Payload in support of Surface Ship Torpedo Defense. Fund technical engineering work at Navy labs and field activities to support Center projects.

-- (U) (\$1,269) Portion of extramural program reserved for Small Business Innovation Research Assessment in accordance with 15 U.S.C. 638.

3. (U) FY 2000 PLAN:

- (U) The Navy MANTECH program executes a significant amount of its projects through the Centers of Excellence. The technical efforts performed are reflected throughout the following taxonomy:

-- (U) (\$12,750) Composites Processing and Fabrication - Continue work on the Composites Affordability Initiative; the Composites Topside Structures; Enhanced Production Techniques for Low Observable Structures and Materials; Teaching Factory; Rapid Response; Z-Direction Reinforcement for Composite Laminates; Ceramic Matrix Composites; and Resin Transfer Molding. Complete Korex Phase II.

-- (U) (\$8,500) Electronics Processing and Fabrication - Continue AEGIS Electronic Demonstration, Flexible Manufacturing of Microwave Power Module Manufacturing, Learning Center and Demonstration Factory, and the Power Electronic Building Blocks Manufacturing plan. Continue electro-optics efforts in Sapphire Domes, Manufacturing Automation of Monolithic Ring Gyros; and initiate efforts for Fiber Optic Velocity Sensors, Remote Source Lighting Technology, Conformal Acoustic Velocity Sensor Accelerometer Manufacturing, Radio Frequency Photonics for Multi-Function Phased Array Antennas, and Affordable Array Technology Tooling.

-- (U) (\$18,000) Metals Processing and Fabrication - Continue the following metalworking projects: Centrifugally Cast Titanium/Chromium Bronze Components, Neodymium Ribbon Development, Optimized Atomization of Magnesium Powder, Titanium Alloy Hearth Melting Processing Technology, Optimized High Strength Lightweight Alloy Welding, and Thin Wall Superalloy Structural Castings. Complete Powder Metallurgy and Materials Initiative; Femto 2nd Laser. Continue the following joining projects: Weld Residual Stress and Distortion, Titanium Welding, Adhesive Bonding Integrity, Knowledge Based Ultrasonic Testing of Welds, and continue rapid response actions. Continue the following materials processing initiatives: Laser Processing of Nickel Aluminum Bronze, Non-Contact High Speed Gear Inspection, Repair/Refurbishment of Fatigue/Wear

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Budget Item Justification
(Exhibit R-2, Page 7 of 11)

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FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY:

7

PROGRAM ELEMENT: 0708011N

PROGRAM ELEMENT TITLE: Manufacturing Technology Development

PROJECT NUMBER: R1050

PROJECT TITLE: Manufacturing Technology

Limited Navy Structures, Advanced Manufacturing Processes for the Advanced Amphibious Assault Vehicle, and Manufacturing of High Performance of Transmission Housing. Initiate a new joint effort with the Air Force in Metals Affordability.

- (U) (\$6,750) Advanced Manufacturing Enterprise - Continue leveraging the Best Manufacturing Practices and the Acquisition Center of Excellence Acquisition Reform Initiatives. Continue documenting environmental manufacturing and business practices. Continue efforts in shipbuilding and simulation based design. Continue efforts in Shipboard Sensors; Effective Aluminum Catamaran Structures; Chromium Primer for Aluminum Substrates; and the Environmental Resource Information Center. Continue ongoing and initiate new research efforts in support of the Maritime Technology Advanced Shipbuilding Enterprise. Continue efforts in Propulsor Encapsulation.
- (U) (\$10,104) Other - Continue projects in the repair technology arena that support the depots and shipyards such as Supercritical CO2 Parts Cleaning, Ball Valve Repair Process Improvement, Shearography System Development, and Reverse and Re-Engineering Technical Data Generation System. Continue the Ammonium Dinitramide and Composite Propellants projects in support of energetic materials. Continue Phase III of the F414 Engine Demonstration Device with General Electric.
- (U) (\$3,000) Initiate efforts based on the prioritization submitted by the MANTech Executive Steering Committee. Initiatives will be focused on composites, metals and electronics.

B. (U) PROGRAM CHANGE SUMMARY: See total program change summary for P.E.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E: Not applicable.

D. (U) SCHEDULE PROFILE: Not applicable.

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Budget Item Justification
(Exhibit R-2, Page 8 of 11)

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FY 2000 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0708011N PROJECT NUMBER: R1050
PROGRAM ELEMENT TITLE: Manufacturing Technology Development PROJECT TITLE: Manufacturing Technology

A. (U) PROJECT COST BREAKDOWN: (\$ in thousands)

Project Cost Categories	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
a. Process Development	65,300	55,000	53,617
b. Program Management Support	9,268	3,909	5,487
Total	74,568*	58,909	59,104

*Reflects actual execution. This includes \$22,676 thousand of FY 1997 carryover and \$51,892 thousand in FY 1998 funds.

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RDT&E PE/Project Cost Breakdown
(Exhibit R-3, Page 9 of 11)

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FY 2000 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0708011N PROJECT NUMBER: R1050
 PROGRAM ELEMENT TITLE: Manufacturing Technology Development PROJECT TITLE: Manufacturing Technology

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION: (\$ in thousands)

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1997 & Prior	FY 1998 Budget	FY 1999 Budget	FY 2000 Budget	To Complete	Total Program
Product Development										
GLCC	C/BAA	1995	CONT.	CONT.	86,928	14,000	14,000	12,000	CONT.	CONT.
CTC	SS/CPFF	1988	CONT.	CONT.	161,495	20,000	15,000	15,000	CONT.	CONT.
EWI	C/BAA	1996	CONT.	CONT.	8,100	3,000	3,000	3,000	CONT.	CONT.
ACI	C/BAA	1995	CONT.	CONT.	9,500	6,000	6,000	6,000	CONT.	CONT.
UNO	C/BAA	1998	CONT.	CONT.	2,000	3,875	4,000	4,000	CONT.	CONT.
PSU	C/CPFF	1997	CONT.	CONT.	3,450	7,000	3,000	3,000	CONT.	CONT.
BFTC	C/CA	1994	CONT.	CONT.	11,881	0	0	0	0	11,881
PTI	C/CPFF	1997	CONT.	CONT.	5,000	5,000	4,500	4,000	CONT.	CONT.
TBD	C/CA	1999	UNK	25,000	0	1,000	4,000	2,500	CONT.	CONT.
NSWC-CD	WX	1998	UNK	UNK	1,350	1,398	1,300	1,000	CONT.	OCNT
NSWC-IN	WX	1996	UNK	UNK	UNK	3,000	2,000	2,000	CONT.	CONT.
TBD	TBD	TBD	TBD	TBD	0	0	0	3,000	0	0
IPI	C/CPFF	1995	UNK	UNK	4,274	2,700	0	0	0	9,542
Miscellaneous	WX/RC/WR	Various	Various	Various	7,595	2,109	2,109	3,604	CONT.	CONT.
Support and Management:	Not applicable.									

Test and Evaluation: Not applicable.

GOVERNMENT FURNISHED PROPERTY: Not applicable.

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RDT&E PE/Project Cost Breakdown
 (Exhibit R-3, Page 10 of 11)

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FY 2000 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0708011N PROJECT NUMBER: R1050
 PROGRAM ELEMENT TITLE: Manufacturing Technology Development PROJECT TITLE: Manufacturing Technology

	Total FY 1997 & Prior	FY 1998 Budget	FY 1999 Budget	FY 2000 Budget	To Complete	Total Program
Subtotal Product Development	293,978	74,568	58,909	59,104	CONT.	CONT.
Subtotal Support and Management	0	0	0	0	0	0
Subtotal Test and Evaluation	0	0	0	0	0	0
Total Project	293,978	74,568	58,909	59,104	CONT.	CONT.

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RDT&E PE/Project Cost Breakdown
 (Exhibit R-3, Page 11 of 11)

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Exhibit R-2, RDT&E Budget Item Justification		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE	
	Program Element (PE) Name and No. MARITIME TECHNOLOGY/P.E. 0708730N	
	RDT&E/BA-7	

COST (\$ in Millions)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Total P.E. Cost	0	19.0	19.7	19.4	19.6	19.5	0	0	0	97.2
MARITECH/S2466	0	19.0	19.7	19.4	19.6	19.5	0	0	0	97.2
Quantity of RDT&E Articles & cost	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

A. Mission Description and Budget Item Justification

MARITECH was initiated by DARPA in 1994 as part of the President's National Shipbuilding Initiative to enhance the commercial viability of the U.S. shipbuilding industry and preserve that section of the defense industrial base. The MARITECH Advanced Shipbuilding Enterprise (ASE) is a Navy program that will build on the progress made by the original DARPA MARITECH. The mission of the program is to manage and focus national research funding on technologies that will reduce the cost of naval ships and will establish U.S. commercial shipbuilding competitiveness. MARITECH ASE will integrate DARPA's MARITECH, the Navy's National Shipbuilding Research Program (NSRP) and Manufacturing Technology efforts. Industry has expanded on the long standing collaborative network of the NSRP to form an organizational structure to execute the research projects to be accomplished under MARITECH ASE.

The industry has developed a landmark long range Strategic Investment Plan which will guide MARITECH ASE investments. This Strategic Investment Plan provides a framework to guide collaborative research and development among all segments of the U.S. ship construction and repair industry, educational and research institutions, and Government. The objective is assist the industry in achieving significant reduction in the cost and time required for both commercial and Navy ship construction, conversion, and repair. The recommended investment portfolio includes major initiatives that tie the strategic vision to proposed industry research through collaborative R&D. The major initiatives include: Shipyard Production Process Technologies, Product Design and Material Technologies, Facilities and Tooling, Business Process Technologies and Systems Technologies. Additionally, several critical success factors were found to cut across all of the major initiatives. These "Crosscut Initiatives" include Education and Training, Technology Transfer, Organizational Change, Environmental Protection and Human Resources.

MARITECH ASE will have a number of distinguishing features. It will: a) be led by an industry collaboration; b) be guided by a Strategic Investment Plan; c) use a structured analytical process for cost/benefit decisions; d) maintain market led benchmarking and metrics to track industry progress; e) promote collaboration with the research and acquisition communities; f) foster cooperation with ship owners, designers, regulators, suppliers and other industry stakeholders; and g) leverage work accomplished by other industries/countries.

The initial collaboration of major shipyards that will lead the program are: Electric Boat Corporation, Bath Iron Works, Newport News Shipbuilding, Atlantic Marine, Ingalls Shipbuilding, Halter Marine Group, Avondale Industries, Inc., NASSCO and Todd Pacific.

FY 1998 ACCOMPLISHMENTS: During FY1998, the industry collaboration brought together experts who represented the broad maritime industry to prepare the five-year Strategic Investment Plan for MARITECH ASE. The industry also developed the organizational structure and operational procedures which will enable them to select, award and manage research projects. This effort was jointly funded by DARPA and industry partners.

FY 1999 PLAN:

- (U) (490K) Establish and staff a co-located multi-agency MARITECH ASE support office (NAVSEA, MARAD, ONR).
- (U) (452K) Establish, develop and execute a Joint Funding Agreement with the shipbuilding industry collaboration using other transactions authority.

R-1 Item No 193-1 of 193-5

Exhibit R-2 RDT&E Budget Item Justification
(Exhibit R-2, Page 1 of 5)

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Exhibit R-2, RDT&E Budget Item Justification		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE	
RDT&E/BA-7	Program Element (PE) Name and No. MARITIME TECHNOLOGY/P.E. 0708730N	

- (U) (13,952) Work with the industry collaboration to award cost-shared technology development projects in accordance with the Strategic Investment Plan (SIP) covering the areas of Shipyard Production Processes, Product Design and Material Technologies, Facilities and Tooling, Business Processes, Systems Technologies, and the cross-cut initiatives which include Education and Training, Technology Transfer, Organizational Change, Environmental Protection and Human Resource Optimization.
- (U) (275K) Support Government and university participation on the industry-led major initiative teams. Participants will promote technology transfer between the industry and the R&D community and will act as technology scouts for the industry.
- (U) (503K) Transfer ongoing research projects from DARPA MARITECH and the National Shipbuilding Research Program to the MARITECH ASE program in order to consolidate management resources. Support existing Cooperative Agreements including agents such as MARAD, ONR, NSWC, and NRL to continue and close out the remaining DARPA projects.
- (U) (250K) Perform an annual review and update of the Strategic Investment Plan.
- (U) (200K) Establish a Government team to work with industry on developing a benchmarking study to assess the competitive position of the industry.
- (U) (2,400) As directed by Congress, provide funds to develop advanced concepts to mitigate marine oil spills caused by tanker casualties.
- (U) (478K) Portion of extramural program is reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

FY 2000 PLAN:

- (U) (18,150) Solicit new proposals and continue to fund technology development projects in accordance with the Strategic Investment Plan.
- (U) (500K) Operate multi-agency support office to facilitate technology transfer between Government and industry.
- (U) (300K) Support Government and university participation on the industry-led major initiative teams. Participants will promote technology transfer between the industry and the R&D community and will act as technology scouts for the industry.
- (U) (300K) Close out DARPA MARITECH and NSRP projects that transferred to MARITECH ASE.
- (U) (250K) Perform annual review of Strategic Investment Plan.
- (U) (200K) Update benchmark study and assess progress being made by industry to achieve competitive levels.

B. Program Change Summary:

	FY 1998	FY 1999	FY 2000
FY 1999 President's Budget:	0	0	0
Appropriated Value:	0	0	0
Adjustment to FY 1998 Appropriated Value/			
FY 1999 President's Budget:	0	0	+19.7
FY 2000 PRES Budget Submit:	0	+19.0	0

Funding: Transferred from DARPA (MARITIME TECHNOLOGY, PE 0603746E)

Schedule: 2nd qtr FY1999: Execute Joint Funding Agreement, Release Research Announcement, Receive first research proposals. 3rd Quarter FY 1999: Award Research Agreements for research projects, Update SIP and Program Plan, Update benchmarking study. 4th Quarter FY 1999: Initiate 2nd solicitation for technology developed projects.

R-1 Item No 193-2 of 193-5

Exhibit R-2 RDT&E Budget Item Justification
(Exhibit R-2, Page 2 of 5)

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Exhibit R-2, RDT&E Budget Item Justification		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE	
RDT&E/BA-7	Program Element (PE) Name and No. MARITIME TECHNOLOGY/P.E. 0708730N	

Technical: Not applicable.

C. Other Program Funding Summary (Related RDT&E): DARPA P.E. 0603746E (MARITECH) - MARITECH ASE follows the original DARPA MARITECH program . Work remaining under the original DARPA program will transition to the MARITECH ASE program.

D. Acquisition Strategy: R&D projects will be solicited and awarded by an industry collaboration represented by the Executive Control Board (ECB) of the National Shipbuilding Research Program (NSRP). The Navy will enter into an agreement with the industry collaboration using "other transaction" authority pursuant to 10 U.S.C. 2371.

E. Schedule Profile:

FY 98 FY 99 FY 00

Engineering Milestones: N/A

T&E Milestones: N/A

Contract Milestones:

N/A 2Q Sign "Other Transactions" Agreement w/Industry

2Q Solicit Proposals for Technology Developed Projects

3Q Evaluate Proposals

4Q Initiate 2nd Solicitation for Technology Developed Projects

2Q Staff Multi-Agency Program Office

3Q Initiate New Technology Development Projects

3Q Begin Update of Benchmarking Study/SIP

Other Program Events:

1Q Initiate 2nd Set of Technology Developed Projects

R-1 Item No 193-3 of 193-5

Exhibit R-2 RDT&E Budget Item Justification
(Exhibit R-2, Page 3 of 5)

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Exhibit R-3 Cost Analysis		Date: February 1999	
APPROPRIATION/BUDGET ACTIVITY		PROJECT NAME AND NUMBER	
RDT&E/BA-7		MARITECH/S2466	
PROGRAM ELEMENT NAME AND NUMBER		MARITECH/S2466	
MARITIME TECHNOLOGY-P.E. 0708730N			

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total Pys Cost	FY99 Award Date	FY00 Cost	FY00 Award Date	FY01 Cost	FY01 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Technology Development	SS OT*	ECB NSRP**	0	15.5M	2Q99	17.8M	2Q 00		52.8M	86.1M	86.1M
Subtotal Technology Development			0	15.5M		17.8M			52.8M	86.1M	86.1M

Remarks:

* Other Transaction IAW 10 USC 2371

** Executive Control Board of the National Shipbuilding Research Program

Government Support Services Other Agencies	MIPR/ WR	Various	0	2.4M	2Q99	.4M	1Q 00		1.2M	4.0M	4.0M
Support Services Revolving Accounts	MIPR/ WR	Various	0	.3M	2Q99	.3M	1Q 00		.9M	1.5M	1.5M
Subtotal Support			0	2.7M	NA	.7M			2.1M	5.5M	5.5M

Remarks:

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Exhibit R-3 RDT&E Budget Item Justification
(Exhibit R-3, Page 4 of 5)

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Exhibit R-3 Cost Analysis		Date: February 1999										
APPROPRIATION/BUDGET ACTIVITY		PROJECT NAME AND NUMBER										
RDT&E/BA-7		MARITECH/S2466										
PROGRAM ELEMENT NAME AND NUMBER		MARITIME TECHNOLOGY-P.E. 0708730N										
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total Pys Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date	FY01 Cost	FY01 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Subtotal T&E (Not applicable)												
Remarks:												
Contract Support Services	Reqn *	TBD	0	.8M	2Q99	1.2M	1Q 00			3.6M	5.6M	5.6M
Subtotal Management			0	.8M	NA	1.2M				3.6M	5.6M	5.6M
Remarks:												
* Procure Under GSA Schedule												
Total Cost			0	19.0M	NA	19.7M				58.5M	97.2M	97.2M

R-1 Item No 193-5 of 193-5

Exhibit R-3 RDT&E Budget Item Justification
(Exhibit R-3, Page 5 of 5)

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Program Funding (\$M) Tracking
'94 through '97

Navy		1994	1995	1996	1997	Total
Naval Aerospace Medical Research Lab						
	Technical Reports		4	1	12	17
	Funding	6.24	7.096	4.145	2.912	20.393
Naval Air Warfare Center						
	Technical Reports	214	245	220	271	950
	Funding	1.475	1393.5	1284.487	1264.038	3943.5
Naval Biodynamics Laboratory						
	Technical Reports	3	9	7	0	19
	Funding	5.17	7.789	1.208	0	14.167
Navy Clothing and Textile Rsch Facility						
	Technical Reports	6	8	2	0	16
	Funding	1.848	2.83	2.723	1.691	9.092
Naval Comd. Control & Ocean Surveillance						
	Technical Reports	298	225	247	555	1325
	Funding	455.011	568.71	497.877	546.295	2067.893
Naval Dental Research Institute						
	Technical Reports	5	12	1	0	18
	Funding	1.901	1.842	1.414	1.392	6.549
Naval Facilities Engineering Svcs. Ctr.						
	Technical Reports	17	34	43	55	149
	Funding	41.471	32.892	27.972	34.992	137.327
Naval Health Research Ctr. San Diego, CA						
	Technical Reports	50	66	58	63	237
	Funding	8.033	13.032	10.355	11.15	42.57
Naval Medical Research Ins. Bethesda, MD						
	Technical Reports	117	194	131	39	481
	Funding	51.261	50.507	49.363	16.871	168.002
Naval Medical Research Ins. Unit #2						
	Technical Reports	0	0	0	0	0
	Funding	3.562	3.602	4.331	3.539	15.034
Naval Medical Research Ins. Unit #3						
	Technical Reports	0	9	6	5	20
	Funding	5.491	5.865	4.9	5.821	22.077
Naval Personnel R&D Ctr.						
	Technical Reports	38	20	68	21	147
	Funding	18.64	18.252	14.686	13.79	65.368
Naval Research Laboratory						
	Technical Reports	396	572	366	421	1755
	Funding	623.638	585.7	614.1	658.936	2482.374
Naval Submarine Medical Rsch						
	Technical Reports	7	10	6	13	36
	Funding	0	2.475	3.664	3.656	9.795
Naval Surface Warfare Ctr.						
	Technical Reports	499	467	418	441	1825
	Funding	959.312	961.2	974.6	954.914	3850.026

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**Program Funding (\$M) Tracking
'94 through '97**

Naval Undersea Warfare Ctr.

Technical Reports	285	148	236	149	818
Funding	346.9	348.4	315	289.8	1300.1
Total Technical Reports	1935	2023	1810	2045	7813
Total Funding	2529.95	4003.692	3810.825	3809.797	14154.267

Air Force

Armstrong Lab.

	1994	1995	1996	1997	Total
Technical Reports	36	8	10	22	76
Funding	166.1	162.3	180.5	191.312	700.212

Arnold Eng. Development Lab.

Technical Reports					0
Funding	251.038	241.737	289.358	277.515	1059.648

Development Test Ctr.

Technical Reports	46	70	21	28	165
Funding	263.7	584.053	554.214	249.87	1651.837

Flight Test Ctr.

Technical Reports	8	13	19	20	60
Funding	257.718	584.053	554.214	575.717	1971.702

Phillips Lab.

Technical Reports	32	65	48	41	186
Funding	444.229	399.3	452.56	463.632	1759.721

Rome Lab.

Technical Reports	75	58	35	29	197
Funding	284.888	324.452	368.69	368.938	1346.968

Wright Lab.

Technical Reports	247	239	214	154	854
Funding	1029.4	1016.5	1043.7	1031.9	4121.5

46th Test Group

Technical Reports					0
Funding		56.646			

**Total Technical Reports
Total Funding**

Army

Aberdeen Test Center

	1994	1995	1996	1997	Total
Technical Reports	140	109	104	158	511
Funding	46.4	70.4	65.5	58	240.3

Aeromedical Research Lab

Technical Reports	0	1	0	0	1
Funding	5.8	5	4.9	4.7	20.4

Armament Rsch. Dev., Picatinny, NJ

Technical Reports	156	158	201	131	646
Funding	309.6	344.1	305.6	292.6	1251.9

Army Research Lab, Adelphi, MD

Technical Reports	319	436	420	391	1566
Funding	408.4	399.2	284.4	324	1416

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Program Funding (\$M) Tracking
'94 through '97

Aviation Rsch, Dev., & Eng., Lab, St. Louis						
Technical Reports	0	0	0	0	0	
Funding	98	117.5	114.4	129.9	459.8	
Aviation Technical Test Center, Ft. Rucker						
Technical Reports	23	21	32	102	178	
Funding	22.2	14.2	14.8	9.8	61	
Biomedical Rsch & Dev Lab, Ft. Detrick						
Technical Reports	15	9	2	1	27	
Funding		6.1			6.1	
CECOM - Ft. Monmouth						
Technical Reports	28	25	65	61	179	
Funding	286.5	304.9	304.1	308	1203.5	
Cold Regions Rsch & Eng Lab - Hanover						
Technical Reports	54	76	47	52	229	
Funding	23.3	23	19.6	17.1	83	
Construction Eng Rsch Labs - Champaign						
Technical Reports	122	134	101	123	480	
Funding	50.6	55.4	42.7	41.3	190	
Dugway Proving Ground - Dugway						
Technical Reports	42	56	33	159	290	
Funding	56.2	57.8	46	40.9	200.9	
Edgewood RD&E Ctr., - APG						
Technical Reports	159	152	118	124	553	
Funding	180.5	151.3	199.8	174.2	705.8	
Institute of Surgical Research - Ft. Sam H.						
Technical Reports	13	0	0	0	13	
Funding	9.6	7.8	7.5	5.9	30.8	
Materiel Systems Analysis Act. - APG						
Technical Reports	6	7	11	28	52	
Funding	32	29.2			61.2	
Medical Rsch Institute Chemical - APG						
Technical Reports	28	44	49	40	161	
Funding	16	36.6	32.2	27.8	112.6	
Med., Rsch Institute Environ., - Natick						
Technical Reports	46	52	47	64	209	
Funding	8.4	8.4	9.9	9.7	36.4	
Med., Rsch Institute Infectious - Natick						
Technical Reports	39	75	77	47	238	
Funding	27.2	25.4	22.8	23.7	99.1	
Missile RD&E Center - Redstone						
Technical Reports	155	175	99	57	486	
Funding	217.7	292.4	358.6	326.5	1195.2	
Natick RD&E Center - Natick						
Technical Reports	28	49	38	11	126	
Funding	114.3	60.2	82	94.2	350.7	
OPTEC Test & Exper., Ft. Hood						
Technical Reports	60	49	42	290	441	
Funding	78.6	76.1	59.5	48.4	262.6	

5/5/99

Program Funding (\$M) Tracking
'94 through '97

Redstone Technical Test Ctr., - Redstone						
Technical Reports	19	13	1	6	39	
Funding	32.6	27.5	25	26.6	111.7	
Research Institute Behavioral Science, VA						
Technical Reports	34	38	35	48	155	
Funding	34.3	27.7	23.8	25.6	111.4	
Tank-Automotive RD&E Ctr - Warren, MI						
Technical Reports	4	28	12	14	58	
Funding	156.2	158.6	129	108.6	552.4	
Topographic Eng., Center - Alexandria, VA						
Technical Reports	47	4	10	4	65	
Funding	27.3	33.5	58.8	45.5	165.1	
Walter Reed Army Institute of Rsch., DC						
Technical Reports	132	178	92	80	482	
Funding	60	61.9	59.5	54.6	236	
Waterways Experiment Station - Vicksburg						
Technical Reports	255	392	235	183	1065	
Funding		272.7	237.7	228.8	739.2	
White Sands Missile Range - NM						
Technical Reports	11	9	7	121	148	
Funding	181.7	268	285.3	276.2	1011.2	
Yuma Proving Ground - Yuma, AZ						
Technical Reports	34	44	29	122	229	
Funding	74.8	93.8	96.8	96.7	362.1	
Cumulative Total						
Army - Total Technical Reports	2305	2662	2239	2645	8681	
Army - Total RDT&E Funding	2592.5	3056.4	2914	2824.9	11387.8	
Project Grand Total	4240	4685	4049	4690	16494	
		10.5%	-4.5%	10.6%		
Funding Grand Total	5122.45	7060.092	6724.825	6634.697	25542.067	
		37.8%	31.3%	29.5%		

Average '98 CBD project cost \$ 5.251

445	-191	450
1937.64	1602.372	1512.244